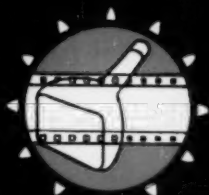


**JOURNAL OF THE**



**SMPTE**

**289 Progress Committee Report for 1957 • Lloyd Thompson**

CinemaScope – Cinemiracle – M-G-M 65 – Superscope – Technirama  
Todd-AO – Projectors – Optics – Photo and Magnetic Sound Recording  
Studio Designed Equipment – Stereo Sound – Magnetic Materials  
Films – Processing Techniques and Equipment – Cameras – 16mm Projectors  
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**343 Letters to the Editor: TV Receiver Picture-Area Losses**

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# SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS

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## Progress Committee Report for 1957

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### Introduction

Although 1957 was not a year of large revolutionary technological developments, this Progress Report reflects substantial improvements and developments in many areas. Production and exhibition of wide-screen films have become generally standardized. The use of motion pictures and television in nontheatrical fields continued to increase. Theater feature film producers, whose engineering departments were

once responsible for many developments, curtailed their engineering or research activities and some even abolished certain departments.

Television became the No. 1 money-maker in pictures.<sup>1</sup> As the movie industry completed a half-century in Hollywood, predictions were for a harder lot for performers and producers.<sup>2</sup> Hollywood became the television capital.<sup>3</sup> Radio City celebrated its 25th Anniversary.<sup>4</sup>

### Suggestions for the Report on 1958

First, looking at the present Report: It is longer than any of the previous reports, mainly because of the number

of reports received from foreign countries; although these reports will not be instructive for all readers in all technical and geographic areas, they have been included in as complete form as possible because their substance is not readily available to Society members and because we feel these are important because progress knows no boundaries. Only a portion of the illustrations submitted by Committee Members has been retained; proper economy dictated that we not repeat illustrations readily available in the pages of the *Journal* or other largely circulated periodicals. At the same time, however, we want the illustrated report to be not only interest-

Submitted April 7, 1958, by Lloyd Thompson, Committee Chairman, The Calvin Company, 1105 Truman Rd., Kansas City 6, Mo. The Committee makes an annual report, this report covering the calendar year 1957.

ing but also to reflect obviously, if possible, the general pattern of the past year's progress.

Then, looking forward to a Report on 1958:

(1) Despite the stricture on pictures noted above, there should be many pictures with each Committee Member's report, to permit the best overall selection for the Report as a whole. Even though an illustration may not be used, it will serve as important documentation in the file of the Report.

(2) Information will be welcomed for areas of the technology or for companies which are currently overlooked.

(3) We would like to continue to expand the number of countries represented.

(4) The Chairman for next year has not been appointed but if any reader has something for the Report and does not know the Committee Member to whom to send it, send it to me:

Lloyd Thompson, c/o The Calvin Company, 1105 Truman Road, Kansas City 6, Mo., U.S.A.

# CinemaScope

During the year, 96 CinemaScope features were completed and released. Fourteen of these were by foreign producers. At least 21 features were completed in compatible anamorphic processes; and a considerable number of short subjects and cartoons were produced in the CinemaScope process.

Several new systems were announced but most of them ended up with prints in CinemaScope format, for example: Technirama, M-G-M 65, some Todd-AO (35mm prints) and Fox 55. Some new processes include Panavision,<sup>6</sup> Suparama,<sup>8</sup> Moeller Anamorphic for 8mm and 16mm,<sup>7</sup> Scanoscope<sup>8</sup> and Naturama. A two-strip 35mm process called Thrillarama was designed and built by R. G. Wolff Studios.<sup>9</sup>

Although only a few new CinemaScope installations are noted for the United States in a report as of September 1957, there was an increase of about 14% over the 1956 figure for installations throughout the world. Comparatively minor gains in the growth of CinemaScope in some areas may lead to the conclusion that the saturation point has been reached, and that only part-time or other marginal theaters are still unequipped for CinemaScope: the figures below show that 84.5% of theaters in the United States and 83% in the United Kingdom are equipped for CinemaScope, with only minor increases reported for these two areas, although considerable growth is evident in other areas of the world.

In September 1957 there were 46,544 CinemaScope installations throughout the world, distributed as follows:

Countries	Cinema-Scope Installations	Total Theaters
U. S. and Canada.....	17,644	20,971
United Kingdom.....	3,746	4,522
Australia.....	1,233	1,735
New Zealand.....	245	589
South Africa.....	426	613
Japan and Far East....	3,074	10,501
France.....	2,557	5,635
Italy.....	4,440	9,543
West Germany.....	3,601	8,110
Other European countries.....	5,819	13,084
Central and South America (including Mexico).....	3,759	9,435

In addition to the foregoing, there were 1,554 installations throughout the world on order or in the process of being installed.

The equivalents of CinemaScope installations are reported to have been made extensively within Iron Curtain countries, including East Germany, but no data are available. These are believed to follow CinemaScope standards.

As indicated in the 1956 report, the "magoptical" release print, which provides a combination of magnetic- and optical-type sound on a single print, was made available for distribution by several producing companies during 1957. During the year, at least 10 features were released with "magoptical" sound.

A new "CinemaScope 55" feature, scheduled for release in 1958, is currently before the cameras. New production equipment is being constructed to implement the CinemaScope 55 program.

# Cinemiracle

The first feature in Cinemiracle, *Windjammer*, produced by Louis De Rochemont, opened April 9 at the Roxy Theatre in New York and Grauman's Chinese Theatre, Hollywood.

Cinemiracle employs a three-in-one camera assembly and three interlocked projectors, compared with Cinerama's multiple units. Three vertical picture segments cover the screen, which has a horizontal expanse of 146°. The three recording units of the camera have lenses that are electronically synchronized so that a scene is photographed on three strips of 35mm film in such a way that the margins partially blend; this blending, then vignetting during printing, is designed to eliminate the vertical demarcation lines often apparent during projection.

The camera lenses have a depth of field from 3 ft to infinity at the average working aperture. Film is transported through the cameras by means of a six-sprocket pulldown, at a rate of 146 ft/min. For tilting and panning, the camera unit is used on a conventional heavy-duty tripod or mobile camera mount. The three interlocked projectors are housed in a single booth, their pro-

jection coverage corresponding to the areas covered by the three cameras, with right and left projectors set at right angles to the center one to project the image into adjustable angular mirrors. In an attempt to prevent distortion, the projectors are mounted level with the screen; each projector carries an 8,000-ft reel. The soundtrack is a simple magnetic film, played in synchronization with the picture on equipment interlocked with the projectors. The dimensions of the demonstration-screen were 26 by 63 ft, with a maximum depth at the center of the curve of 13 ft, covering a field of view of 146 by 55°. <sup>10</sup>

Panavision announced a process for making prints for Cinemiracle or Cinerama from single 65mm negatives. Their positive prints are made from a single negative. <sup>11</sup>

# M-G-M 65

*Raintree County*, the first feature to be shot in M-G-M 65, was released in 35mm with the screen format of CinemaScope. No release was made in 65mm. <sup>12</sup> The original shooting was in 65mm Eastman Color Negative. Anamorphism was used in the camera film, with a 1.33 to 1 squeeze ratio resulting in a picture which has an angle of field with aspect ratio exactly 3 to 1. Release prints may be made by three methods: (1) 65mm prints; (2) 70mm prints; (3) 35mm prints which project as CinemaScope. <sup>13</sup> Scheduled for shooting in 65mm are *Ben Hur* <sup>14</sup> and *Cimarron*. <sup>15</sup>

# Superscope

The new Superscope-235 anamorphic print which matches the dimensional characteristics of the CinemaScope 2.35 to 1 optical sound print was developed by Superscope during 1957 and is now available to the motion-picture industry. The compression ratio is 2 to 1. This anamorphic print is realized from normal photography as is the Superscope 2 to 1 print. Production of release prints is carried out by the same method as the printing of the 2 to 1 Superscope print. Superscope-235 is also available for color and black-and-white photography. Both the Superscope 2 to 1 print and Superscope-235 are available to the industry.

Superscope completed anamorphic printing installations in London, Tokyo, Rio de Janeiro and Hollywood and is in a position to service producers with Superscope-235 and regular Superscope any place in the world. During 1957, the Superscope process was used extensively by Columbia Pictures, Universal International Pictures, J. Arthur Rank Productions, Allied Artists Pictures Corp., Toei Motion Picture Co. of Tokyo, and many other producers located throughout the world.

Superscope theater installations during 1957 were an additional 1,000 in theaters



throughout the world, making a total of over 5,000 theaters with Superscope Variable Anamorphic Projection Lenses.<sup>16</sup>

#### Technirama and Technicolor

Technirama, the wide-screen process belonging to Technicolor, is similar in some ways to both VistaVision and CinemaScope. Technirama employs partial anamorphism in the camera and further anamorphism in the printing operation. New cameras for this process have been made by N. V. Optische Industrie of Oude Delft, Holland. Prints are made by the Technicolor dye-transfer process.<sup>17</sup> A special Technirama projector called the Micronlambda has been developed by Microtechnica, Turin, Italy.<sup>18</sup>

Technicolor also began processing 16mm and 8mm amateur movie film in New York and Hollywood. Services available from the New York plant include processing of Anscochrome, Ektachrome and Kodachrome, Kodak Type C Prints and Kodak Dye Transfer Prints.<sup>19</sup>

#### Todd-AO

The only technical improvement announced for Todd-AO during 1957 was some test screenings for the Todd-AO show, *Around the World in 80 Days*, in the 35mm system. Technical details were not described.<sup>20</sup> Theater installations for the Todd-AO process continued during the year. Chicago and Los Angeles each had two theaters so equipped, and six Rank theaters planned installations. Two theaters in Texas were set up to show *South Pacific* in Todd-AO. This brought the total Todd-AO theaters to about 50.<sup>21</sup>

#### VistaVision

No specific report was obtainable on VistaVision. A number of feature pictures were released in VistaVision.

#### Projectors, 35mm

During 1957, the Magnasync Manufacturing Co. developed a combination 35/65/70mm penthouse reproducer (Model PH-3570) for use with wide-gauge film projectors. This model is capable of transporting and scanning different film widths with varying track placement with the film path being directed around a three-drum-flywheel transport mechanism. As may be noted from Fig. 1, the 35mm CinemaScope film path is substantially identical to the standard CinemaScope reproducer and is made by Magnasync with the four-track scanning head located between two of the aforementioned triple-drum film paths. Wide-gauge films are threaded in such a way as to form a loop around all three drums bringing the six-track scanning head into the proper juxtaposition with the related magnetic tracks. This permits relatively simple

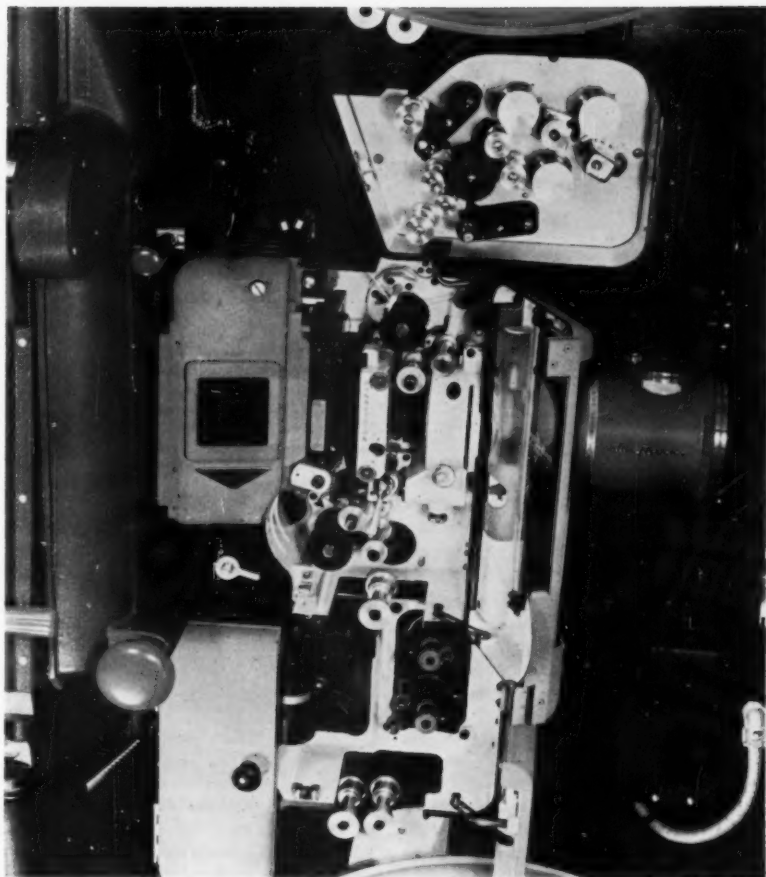


Fig. 1. The Magnasync PH-3570 penthouse.

mounting of the heads with proper azimuth adjustment compared with a design calling for the alternate use of a four-track and six-track scanning head. Also, there is the added inertia derived from the third flywheel and drum assembly, which is important with wide-gauge films.

#### Theaters, Drive-ins

The RCA Impac In-Car Speaker was made with an On-Off spring-loaded button switch on the junction box housing. When the speaker is placed on the speaker post, its weight depresses the button switch against the spring and the voice coil circuit is opened. These speakers are designed to eliminate general overall sound present in many drive-in theaters when speakers are returned to the post with the volume control left in a high level position. RCA also equipped many of its Dyna-Heat In-Car Heaters with microswitches.

Westrex Corp. introduced a new series of high-power transmission units for its drive-in theater systems and as replacement units in existing installations where greater undistorted power is wanted. The units are supplied in sizes as required from 400 continuous watts

for drive-ins of up to 800 cars to 1200 w for a 2400-car drive-in.

Two of the new Westrex 28 type 200-w amplifiers, each with independent power supply, regular and emergency exciter lamp rectifiers and an emergency switching and monitor horn panel, have now been combined in a single 5-ft 6-in. cabinet. The Westrex 28 type main amplifier has a continuous power output rating of 200 w with a harmonic distortion of less than 1% over a frequency range of from 20 to 20,000 cycles and a peak power rating of 400 w with not more than 1% harmonic distortion. The output damping factor of the push-pull triode output has a minimum ratio of greater than 12 to 1, so that the impedance of the in-car speaker circuits is not critical. An output voltage of 57.5, 70.7 (normal), 115 or 141.4 volts may be selected. The 28 type amplifier can be operated from either 50- or 60-cycle sources of power. Although two 28 type amplifiers are normally employed in this 400-w transmission unit, one amplifier can supply sufficient output power to operate 800 in-car speakers on an emergency basis.

The Westrex drive-in theater transmission units are also available with



Fig. 2. The Traid Corp. 720 lens.

continuous output ratings of 600, 800, 1000 and 1200 w. This largest unit of 1200 w has a peak output of approximately  $2\frac{1}{2}$  kw, more than enough to satisfy the requirements of the largest probable drive-in theater or stadium in the world. This tremendous amount of power capacity is contained in only three small rack cabinets which occupy a floor space of less than eight square feet.<sup>22</sup>

Drive-in theaters continued to play an important part in the theatrical film economy, but few improvements in the field are reported. Rome, Italy, got its first drive-in theater. Film patrons got either an English track or an Italian track at the turn of a switch. The theater has an 800-car capacity.<sup>23</sup> A "wireless" sound system was used for the first time in the Dover Drive-In at Dover, N.J.<sup>24</sup> Nearly three times as many people saw movies in drive-ins as in regular theaters in the U.S. in 1956-57. Popcorn revenue totaled 126 million dollars.<sup>25</sup>

#### Optics

A new ultra-fast wide-angle lens of 15mm focal length and  $f/1.3$  aperture was introduced by Bell & Howell. This lens, made by Pierre Angenieux in France, is said to be highly corrected and to provide excellent resolution and contrast over the 16mm format. The lens is mounted so as to be focusable to a near distance of 10 in. with a click stop iris control to  $f/16$ . Additionally, a retro-focus viewfinder is available for use with this lens on 16mm cameras equipped to take interchangeable objectives.<sup>26</sup> Also announced by Bell & Howell for the 16mm photographer were several new cameras. Included in these is the first spool-loading 16mm electric-eye camera for automatic exposure control. This camera, Model 240EE, is equipped with a 20mm  $f/1.9$  lens adapted for the acceptance of wide-angle or telephoto attachments.<sup>27</sup>

A new variable-focus Auto-Zoom lens of  $f/3.5$  aperture was announced by Perkin-Elmer Corp. This lens, in-

tended for 16mm and vidicon TV cameras, has a focal range of 5:1.<sup>28</sup> A wide-angle lens of extreme coverage known as the Traid 720 was introduced by the Traid Corp. (Fig. 2). This lens, which is adaptable to either gun or C mount 16mm cameras, has a focal length of only 3.45 mm and an aperture as great as  $f/1.5$ . A  $165^\circ$  coverage is obtained from this lens, which is about 5 in. long and 4 in. in diameter.<sup>29</sup> A new 50mm  $f/1.9$  Cine Ektar was announced by Eastman Kodak Co. for the Kodak High-Speed Camera. This lens is intended to fill the gap between the existing 25mm wide-angle and the 63mm narrow-angle lenses for the same camera.<sup>30</sup>

Several new lenses were announced by Wollensak Optical Co. for 8mm and 16mm cameras. Among these were three 8mm wide-angle lenses: 6.5mm  $f/1.8$ ; 9mm  $f/1.8$ ; and a 9mm  $f/2.3$  lens; as well as a 25mm  $f/1.4$  lens for 16mm cameras.<sup>31</sup>

An 8mm automatic motion-picture camera, reportedly the first to use light energy alone to power the aperture-setting mechanism, was introduced by Bell & Howell. It is said that this electric-eye camera can adjust to changing light levels faster than the human eye and that it can operate through the full range of apertures,  $f/1.9$  to  $f/16$ , in less than one second.<sup>32</sup> Bell & Howell also announced an 8mm variable-focus projection lens for the Regent and Monterey projectors. This lens, the Filmovara, has a focal range from 15mm to 20mm.<sup>33</sup> Also announced for the 8mm field by Bell & Howell was a 1.5 times wide-angle attachment for the Monterey and Wilshire cameras. This attachment extends the field of these cameras by 125% more than the 10mm lens regularly supplied.<sup>34</sup>

A 17.5mm-70mm  $f/2.4$  Pan-Cinor Zoom lens for the Camex Reflex 8mm reflex camera was introduced. This combination allows for continuous through-the-lens focusing and viewing while changing focal length and filming.<sup>35</sup> A  $\frac{1}{2}$ -in.  $f/1.9$  D mount lens coupled with an exposure meter for visual exposure control was announced by Elgeet Optical Co. (Auto-Ex).<sup>36</sup>

Longines-Wittnauer entered the motion-picture equipment field with the Wittnauer Cine-Twin, a battery-driven camera which has been designed to be converted into a projector in 30 sec. Four turret positions are provided for the various objectives, three for taking and one for projection.<sup>37</sup> Canon of Japan also introduced an 8mm camera, the Canon V-8, a twin-lens camera, which is normally supplied with a 13mm  $f/1.8$  objective and claimed to have features comparable to those of the finest 16mm cameras.<sup>38</sup>

A new 70mm panoramic camera for wide-angle aerial photography was developed by Perkin-Elmer Corp. It is

said that the optical system of this camera, which operates on the scanning principle to cover  $180^\circ$ , will resolve 40 lines/mm on high-speed film.<sup>39</sup>

A new satellite tracking camera covering a field of  $5^\circ$  by  $30^\circ$  using a foot-long strip of 55mm CinemaScope film was developed by James Baker and Joseph Nunn. The focal length of the unique optical system in this camera is 20 in.<sup>40</sup>

High-speed lenses for use in earth satellites have been developed by Zoomar Corp. Mounted opposite each other, the optics will alternate in facing the earth's surface as the satellite rotates. These units have a speed of  $f/0.7$ , a diameter of 3 in. and weigh 2.5 oz including the housing. The lens system is intended to focus infrared radiation onto a small detector unit from which information will be telemetered back to the earth.<sup>41</sup>

A new John Oxberry optical printer handling enlargements up to 4 and reductions down to  $5\frac{1}{4}$  was described. Among the many features of this instrument is a superimposure device having a ground glass marked for a multiplicity of aperture sizes.<sup>42</sup>

Technirama, the wide-screen system developed by Technicolor, was announced, with the chief innovation reported as the anamorphic optical system designed by N. V. Optische Industrie of Oude Delft, Holland. This system, of the prismatic type, was reported superior to others in terms of definition, image distortion and flare.<sup>43</sup>

Super Cinex, a lamp system designed for the special screen brightness requirements of giant indoor and drive-in theaters, has been announced by Radio Corp. of America. The system has a speed of  $f/1.6$  and when operated at 155 amp with a 13.6mm high-intensity positive carbon reportedly gives considerably improved screen illumination as compared with a 125-amp 11mm positive carbon system.<sup>44</sup>

Westinghouse has announced a xenon short-arc projection lamp with promises of being comparable to the carbon arc for 16mm projection. This lamp is said to be most adaptable to color photography. Additionally the new Focus-Lok lamp with a unique socket construction and precise locked-in prefocus alignment was announced.<sup>45</sup>

An  $f/1.4$  projection lens designed to give the maximum light with special emphasis on the elimination of the so-called hot-spot has been introduced by the Projection Optics Co. This design is said to be capable of covering all film sizes up to 70mm in focal lengths from 2.75 in. and up.<sup>46</sup>

A new film viewer, the Richardson Model V-500, has been introduced. This unit will accept the Richardson standard interchangeable film transport mechanism for any size film. Matching condensing and projection lenses for various applications are available.<sup>47</sup>

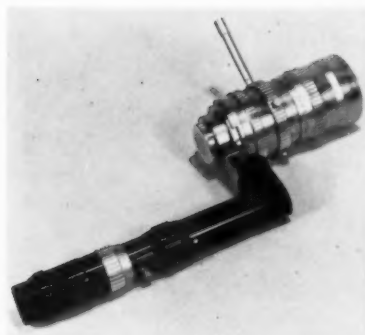


Fig. 3. Angenieux vari-focal lens.

An all-purpose still-picture projector, the Transpaque II, claimed to be the first projector to use a single projection head and lens for opaque, transparency, table, and rear projection, has been announced by Projection Optics Co. It has been designed to project 10 by 10-in. transparencies or 11 by 11-in. opaques, and can be moved or set directly on large objects for projection.<sup>48</sup>

Several new glasses especially designed to maintain their transparency under exposures up to 10<sup>6</sup> Roentgens Cobalt-60mm gamma radiation were described by Bausch & Lomb.<sup>49</sup> A series of papers describing the properties and characteristics of fiber optics has been published. A most interesting presentation relating the use of these fibers to field flatteners is presented in the third of this series by Kapany.<sup>50</sup> Greenler has described interference filters for use in the infrared.<sup>51</sup>

The Ednalite Optical Co., Peekskill, N. Y., has brought out a varifocal 8mm lens, the Pro-Zoom Lens. It has mechanical compensation for image shift and a zoom range from 9.5mm to 28.5mm (1:3). It has a maximum speed of  $f/1.9$  and can be focused from 3 ft to infinity. A coupled zoom-viewfinder shows the field covered by the lens in each zoom position. It also has a field indicator to show whether the lens is in the wide-angle, middle, or telephoto position. A built-in adapter takes Series 6 filters and auxiliary lenses.<sup>52</sup>

Another mechanically compensated varifocal lens for 16mm film has been brought out by Angenieux in Paris, under the name of Angenieux Zoom Type LI. It has a range from 17mm to 68mm and a speed of  $f/2.2$ . The lens can be focused from infinity to 1.2 meters (3.9). The viewfinder works through the lens itself by way of a beamsplitter. This reduces the transmission speed of the lens. On the other hand this arrangement permits focusing through the viewfinder (Fig. 3).<sup>53</sup>

#### Photo and Magnetic Sound Recording

Recording on magnetic material for original takes has become almost uni-



Fig. 4. Eldorado Recording Channel, Ryder Sound Services, Inc.

versal. Improvements have been in making the units smaller, more convenient and versatile in operation, and with better performance.

The 1958 Kinevox-Hallen Model 616 was shown as a 16mm portable magnetic recorder. It incorporates a Davis filter in the design. Recording speed is 36 ft/min.<sup>54</sup>

During 1957 Ryder Sound Services, Inc., introduced two new automatic sound-recording channels. They are known as The Eldorado (Fig. 4) and the Minx. The Eldorado can be loaded with 3,000 ft of 35mm striped magnetic film. The film is driven at 45 ft/min, providing continuous recording service for 66 min without reloading, or the equivalent of 6,000 ft of camera negative. This recorder requires only three cables: a power cable from the stage wall to the unit, a camera cable from the unit to the camera and a microphone cable.

The recorder turns over and stops automatically along with the camera under the control of a standard camera switch, thus eliminating the varied communicating with the recordist. Take numbers, instructions and identification are announced onto the magnetic film by the mixer between takes, instead of at the start of the take, the mixer merely pressing a foot switch to turn over the recorder independently of the camera. The mixer also has volume indicators, on the recording bus and reproduce

monitor, to warn of trouble, including drop-outs or even the slightest pile-up under the head which makes the reproduce volume indicator sluggish.

Facilities on the left side of the unit permit monitoring the reproduced sound. A 1000-cycle tone is placed on the head end of each roll of film and it is, in turn, used to set the transfer level so that the reproduce level from the transfer will be the same as the original recording, regardless of the film sensitivity or the level characteristics of the transfer equipment. There is also the model called Minx, a modernization of the lightweight sound recorder previously introduced by Ryder.<sup>55</sup>

Westrex Corp. announced its 900-Type Recording System, primarily a transfer channel for photographic sound recording on 35mm or 16mm film, but also serving the small studio for both photographic and magnetic recording by the addition of a bias oscillator, magnetic heads and associated circuitry. The system consists of a transmission cabinet, a recorder and its table. The compressor-limiter amplifier and its control unit, the test oscillator, exposure meter, noise reduction unit and power supplies are contained in the transmission cabinet. Most of the units of the system are of new design and are available individually.

The recorder of the above system is available with several types of motors,



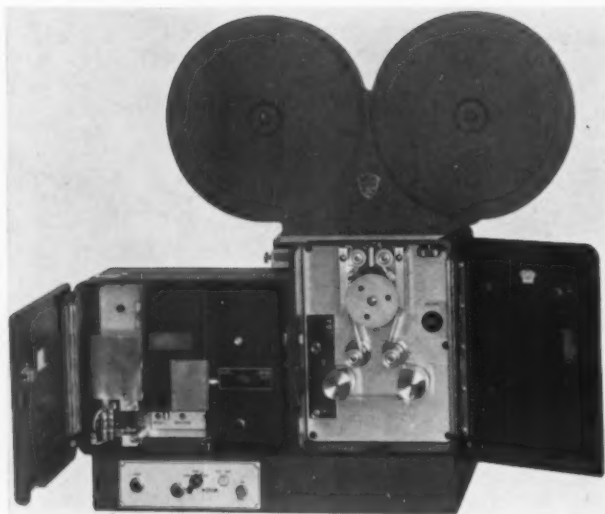


Fig. 5. Westrex Photographic Recorder.



Fig. 6. RCA magnetic bulk film and tape eraser.

is designed for ready change between area and density modulators, and has a symmetrical film path with dual mechanical filtering of film motion for low flutter on both photographic and magnetic film. Basically a photographic recorder, the addition of magnetic recording and monitoring components converts it to a photographic/magnetic recorder (Fig. 5).

Another new item by Westrex is the RA-1614-A Test Oscillator which is used for balancing out thump in compressor or limiter amplifiers. The unit is of miniature size, transistorized, self-powered and produces a pulsed, 20-kc signal with an operating cycle of one second on and one second off.

A new magnetic bulk film and tape eraser was added to the RCA motion-picture sound recording product line. It is capable of erasing an audio magnetic recording, made at a record level of 10 db above 100% modulation, down to a noise level of that existing on new magnetic material. Video recordings can be erased down to a noise level necessary to eliminate all picture elements on playback (Fig. 6). It is designed for erasing up to 2,000 ft of 35mm film or tape wound on a tape or film core, or any narrow width of film or tape roll up to a maximum of 15 in. in diameter. The eraser can be used also, with the appropriate erase coil, to erase 2-in. wide video magnetic tape in rolls of up to 7,200 ft in length.<sup>56, 65</sup>

The Material Laboratory of the Navy Department extended to 16mm magnetic-coated film their previous work on the measurement of absolute surface induction on magnetic-recording tape by the nonmagnetic, single-turn conductor method. Considerations of fringe effects with a reproducer head narrower than the recorded track, spacing between film surface and head surface,

oxide orientation, depth of penetration of the magnetic induction, and correlation between loop measurements and reproducer head measurements were discussed.<sup>57</sup>

Much information of interest and usefulness for magnetic sound recording was derived from the video recording technology involved in the Ampex Video Tape Recorder.<sup>58-60</sup>

Investigations by George Lewin of the Army Pictorial Center on the infrared transparency of magnetic stripe soundtracks showed that excellent sound quality could be obtained from an optical soundtrack even though completely covered by a magnetic stripe. By thus eliminating the need for half-width stripes, superior magnetic recording quality is obtained while avoiding most of the drawbacks of magnetic/optical tracks on composite prints. Other promising applications are for bilingual films and acceptable quality of stereophonic sound on 16mm films.<sup>61, 62</sup>

R. C. Rheineck of CBS News described the use of prestripped magnetic soundtracks on 16mm films for television news material. In addition to the obvious advantages of extended high-frequency response, improved signal-to-noise ratio and lower harmonic and intermodulation distortion, there are many advantages involved in filming, editing and processing.<sup>63</sup>

Lorin D. Grignon and A. P. Green summarized current practices for bulk erasure of magnetic film. Some studios were using equipment of their own design and about an equal number of others were using commercially available equipment. Most equipment was designed with, or modified to include, automatic or semiautomatic controls to eliminate human error.<sup>64</sup>

Carl Shipman and Carl Hittle of RCA Film Recording Section discussed

a source of "pops" in splices in improperly erased magnetic film. "Spokes" on a reel of film, or areas of different residual magnetization, may not be audible at normal film speeds because of the extremely low frequency of the signal they produce. If, however, such a film is spliced, there may be an abrupt change in level of residual magnetization and a loud "pop" may be produced. The remedy obviously is uniform erasure before splicing.<sup>65</sup>

Columbia devised and used an improved method for minimizing cross-modulation distortion in variable-area optical soundtracks. By properly controlling the densities of negative and positive prints, the distortions, chiefly 2nd harmonic, introduced by negative print image growth and recorder slit width can be cancelled by the oppositely-phased distortions generated by positive print image spread and printer contact. Columbia's "Distortion Balance" method provides accurate, rapid and simple means of determining the data on recording lamp current, and negative and positive print densities that will produce minimum distortion on the release print.

Another item of interest from Columbia was the use of dual frequencies for cuing marks, the low recorded frequency of a buzzer being audible during fast running of the film for finding the approximate location of the mark, and the high frequency of a transistorized oscillator permitting exact location of the mark at very slow film speed.

Todd-AO reported a change from 30- to 24-frames/sec on 70mm, six-track release films, with no significant change in sound quality. The five-sprocket-hole frame length was retained. An overall improvement in the final product resulted from experience in the use of the recording and dubbing equipment and



improved quality of the magnetic striping on the release print stock.

Twentieth Century-Fox reported that all CinemaScope productions were being released on combined magnetic/optical prints, the aspect ratio having been changed from 2.55-to-1 to 2.35-to-1 to accommodate the optical half-width track in addition to the four magnetic striped tracks. Nearly all production recording was three-channel stereophonic.

Glen Glenn reported the use of a new method to replace the notched film edge for transfer of soundtracks for foreign-language releases. A photocell and relay system is operated by a small piece of thin, shiny tape attached to the sound film at the beginning and end of each portion of dialogue to be deleted. Easier correction of editing mistakes is permitted and the overall system is more reliable than previous ones.

Warner Brothers reported excellent results from the use of  $\frac{1}{4}$ -in. tape for loop effects with equipment remotely controlled from the dubbing console. Bits of metallic tape attached to the magnetic tape at appropriate points also provided automatic controls.

Most studios reported the use of 35mm magnetic film at 90 ft/min for all production recording, scoring and dubbing; but some reported the use of 17 $\frac{1}{2}$ mm film at 45 ft/min for production recording and at 90 ft/min for scoring and dubbing; others, particularly for television productions, used entirely 45 ft/min up to the release printing at 90 ft/min.

#### Studio Designed Equipment

In the roadshow presentations of certain 35mm release prints of *Around the World in Eighty Days* and *Raintree County* the sound is fed to five behind-the-screen speakers from the three main CinemaScope magnetic tracks. In addition, the fourth track delivers directionally controlled sound to the left, rear and right surround speakers. The main three-track into five-speaker arrangement is obtained by level and division of energy from the three tracks to provide a five-speaker result. The directional distribution from the fourth track is obtained from control tones on the fourth track, in addition to the actual sound material, operating through an integrator into three sets of surround speakers. In other words, sound is supplied and controlled to eight sets of speakers, using only the four regular release tracks.

A multichannel dubbing console capable of simultaneous mixing to stereophonic, composite, and/or separate dialogue, music, and effects recording equipment has been designed and placed into service by Columbia Pictures Corporation Sound Dept. (Fig. 7). The console was designed to provide the many facilities without patching or addition of equipment. There are 28



Fig. 7. Multichannel dubbing console at Columbia Pictures Corp. Sound Department.

stereo input circuits connected to stereo attenuators. Each circuit is equipped with no-loss equalizers and the output of each circuit can be switched to its specific bus with pushbutton switches. Facilities for balancing, group gain control, and either stereophonic and/or monaural reverberation control are provided within the console and are switched into the circuitry. The complete console-channel is capable of recording any or all of the following tracks:

- (1) Stereophonic dialogue storage.
- (2) Stereophonic effects storage.
- (3) Stereophonic music storage.
- (4) Stereophonic composite.
- (5) Monaural dialogue, music, and effects storage.
- (6) Monaural composite.<sup>66</sup>

#### Stereophonic Sound in Motion Pictures

The roadshow group, which includes Cinerama and Todd-AO, continues to make the most of stereophonic sound. All but one of the major studios seem to have abandoned stereo sound.

Twentieth Century-Fox continues to lead the field in quantity of stereophonic release prints; all their 1957 releases were magoptical CinemaScope. This studio returned to the practice of recording the original dialogue as three-channel stereo, instead of monaural, as is the custom at the other majors. The inclusion of an optical track, which is masked to half-width by one of the four magnetic stripes, enables those theaters which either are not equipped for stereo reproduction, or are reluctant to use stereo, to use the half-optical track, which, while down in level 6 db from a

full-width optical, seems to be working out very satisfactorily.

M-G-M released five features in CinemaScope four-stripe magoptical in 1957, with all release prints in stereo for those features. The balance of the M-G-M releases were optical only.

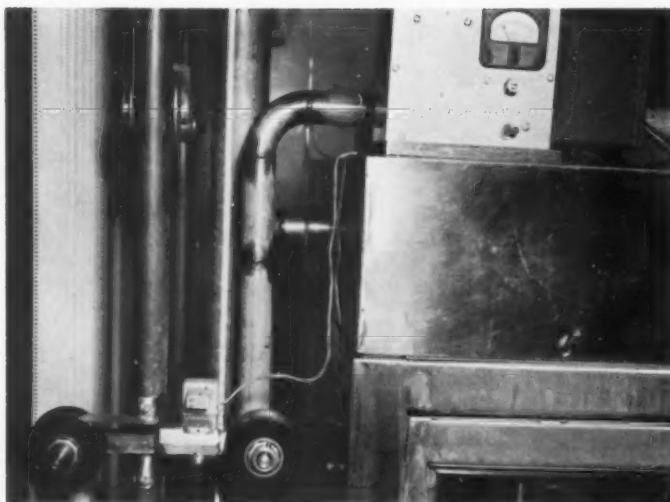
Warner Bros. released only two features with stereophonic sound during the year, and only eight prints were mag-optical. All the rest of the prints of those features were optical only, and the balance of the year's releases were optical only.

Walt Disney Productions continues to turn out prints of *Fantasia* in four-stripe magnetic for both domestic and foreign release. This pioneer stereophonic picture was originally recorded stereo with photographic tracks on separate film, but was in re-release last year in CinemaScope four-track magnetic.

Columbia and Universal-International made no use of stereophonic sound in 1957, and report no plans for such in the near future.

But Cinerama continues to make the most of its six-channel stereo, and includes it in all advertising copy. With the tracks on separate full-coated magnetic film, there are no limitations such as in track width on composite magnetic prints. With the use of manual sound controls, which are an integral part of the Cinerama program, the results are appreciated even by members of the audience who know nothing about the details.

Close on the heels of Cinerama is the Todd-AO release of *Around the World in 80 Days* which has been roadshowed throughout 1957 with many of the installations using 70mm 6-track composite



**Fig. 8. Amplifier and scanning head for infrared replenisher monitoring system, Consolidated Film Industries.**

magnetic prints. During the year, work was completed on the second feature, *South Pacific*, which was released early this year in 70mm, with stereophonic sound.

Thus in the roadshow field, stereo seems to have found its niche, but with dwindling audiences in the theaters showing only the 35mm product, stereophonic sound is gradually fading from the scene. Despite this, several of the Hollywood studios are rather well equipped to do stereophonic sound.<sup>67</sup>

#### **Magnetic Recording Materials**

Reports were that there was little new in this area except that Minnesota Mining announced that after a long production battle it was able to make video recording tape acceptable to the networks. After first showing samples, some of the early production rejected as much as 97 out of 100 rolls.<sup>61</sup>

Reeves Soundcraft began construction of a new plant to meet modern requirements of tape manufacture.<sup>69</sup>

Orradio Industries and Ampex teamed to work on improved tape and manufacturing facilities.<sup>70</sup>

CBS used prestripped 16mm film for single-system cameras for news work.<sup>63</sup>

Minnesota Mining opened what is reported to be the largest tape manufacturing plant in the world, at Hutchinson, Minn.<sup>71</sup>

#### **New Films**

Du Pont introduced a new variable-area sound-recording film. This is designated as Type 833B Fine-Grain VA Sound Recording Film. It is a 35mm material on a nonhalation base. Du Pont also introduced Type 834 TV Recording Film, reported to be 2½ times faster than 824 which it replaces for photographing images on the TV monitor tube.<sup>72</sup>

A new 16mm reversal black-and-white film specially prepared for use in tissue culture time-lapse microphotography was introduced by Gevaert Co. of America.<sup>73</sup>

During 1957, production quantities of Eastman Color Intermediate Film, Types 5253 and 7253 became available. The new material permitted preparation of color master positives and color duplicate negatives for incorporation of special effects. This all-color duplicating system offered some advantages in that it was more economical and less cumbersome than the system involving preparation of black-and-white separation positives and color internegatives. However, it could also be used for preparation of the color duplicate negative from separation positives and this system is still desirable when protection of the original color negative against fading or other damage is wanted.

Announced in the Fall of 1956,<sup>74</sup> Anscochrome Professional Film, Type 242 became available in production quantities during 1957. This is a 16mm soft gradation, reversal color film designed for camera use particularly when prints from the original are required. It is characterized by excellent resolution and fineness of grain. It is balanced for 3200 K tungsten illumination and has an exposure index of 10. It can also be used with daylight quality illumination when a Kodak Wratten Filter No. 83 is employed and the exposure index is reduced to 8.

Ansco Color Negative Film, Type 845 was introduced as an improved version of the Type 844 camera negative material previously supplied. In this new film, the color emulsions are coated on a film base which is tinted to approximate the color of the dye masks found in other color negative materials. A removable carbon black coating provides the

antihalation protection. The tinted base and the recommended processing gradient of 0.65 to 0.70 make this product compatible with other negative and positive color materials. The film is balanced for 3200 K tungsten illumination and has an exposure index of 25. It can also be used with daylight quality illumination with a Kodak Wratten Filter No. 85 and at an exposure index of 16. A unique feature of the Type 845 film is the provision for gradient control by adjustment of the development time. This permits adjustment of the contrast for specialized purposes, such as in the preparation of negatives to be used for making background plates.

For making 16mm prints from positive image color originals, Ansco Reversal Color Print Film, Type 243 was introduced. This film has an alkali-removable carbon black coating for antihalation protection. The film is also designed to give a positive soundtrack when printed from negative soundtrack originals.

At the fall convention in Philadelphia, 16mm Super Anscochrome Film, Type 225 was announced.<sup>75</sup> This is an extremely high-speed color reversal camera film having an exposure index of 100 and balanced for use with daylight illumination.

#### **Film Processing Techniques and Equipment**

Consolidated Film Industries, Hollywood, designed and installed an infrared sensitive scanning head to monitor the film entering the developer section of the spray processing machines. A source of infrared light on the opposite side of the scanner triggers the coupled transistor amplifier (Fig. 8) when exposed raw film passes. A solenoid valve is energized by the amplifier and developer replenisher flows through it to the sump tank of the spray system. The regular leader which passes the scanning head appears transparent to it and the solenoid valve remains closed. Filters in the light beam directed on the scanner permit a narrow bank of light at 900 mμ to be transmitted. Film with undeveloped silver emulsion on it will not transmit in this region, whereas leader is transparent at this wavelength. At this wavelength of the light beam, the silver emulsion is completely insensitive to exposure. This system, which automatically introduces replenisher at the instant the film enters the developer and stops the flow of replenisher at the instant leader enters, permits chemical control of the solution.<sup>76</sup>

Precision Film Laboratories recently completed installation of their own color processing equipment, both 35mm and 16mm.<sup>77</sup>

In 1957 Kling Photo Corp. delivered the first Kodachrome developing machines to the United States. The ARRI machine for Kodachrome is available



Fig. 9. ARRI 16-35 Kodachrome machine—oblique view from dry cabinet end. (Refrigerator unit only shown for placement. It is not connected.)

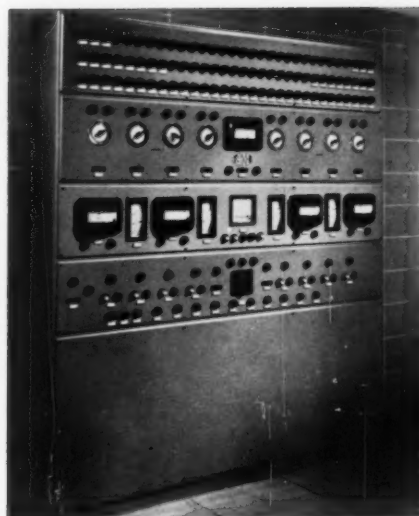


Fig. 10. Main control panel of ARRI Kodachrome machine—optional equipment.

as 35mm, 16mm or in combination. One machine is installed at Technicolor, New York, and two at Berkey Photo Service in New York. These Kodachrome machines conform to Kodak specifications as far as arrangement of tanks, chemistry, etc., is concerned, but use the ARRI bottom-drive system (Figs. 9 and 10).<sup>78</sup>

A process called Permafilm, now being used by numerous film laboratories, has been developed to prevent film damage, by impregnating into the emulsion a compound to toughen the emulsion while maintaining its resiliency. It is claimed not to require renewal.<sup>79</sup>

Two additional ultra-precision slitting machines were added to the 16mm Positive Assembly Dept. at General Film Laboratories, Hollywood. Built by Unicorn Engineering Corp., these machines slit two 16mm sound prints from 35/32 mm stock with a yield of 800 ft/min of 16mm.<sup>80</sup>

General Film Laboratories installed two new high-speed 35mm picture-printing machines to increase production output. These modified Bell & Howell printers incorporate a light modulator operated from punched tape to provide a 30-point control and IBM punched card to establish the light level for the raw stock and negative used. Printing speed is 360 ft/min and the light source is a 500-w tungsten lamp. Vacuum squeegees remove loose dirt during printing operation and feed and takeups have 3,000-ft capacity. Modifications were by Unicorn Engineering Corp.<sup>81</sup>

Additive color printing equipment in the form of the Fish-Schurman three-light head on a Depue optical reduction printer and controlled by a reader system designed and built by Unicorn, and also the Fish-Schurman single-light high-

speed head<sup>82</sup> on a modified, 35mm, Bell & Howell Model D operated at 200 ft/min have proved very successful, particularly by eliminating the time-consuming operation of making the scene-to-scene filter packs of the subtractive method of color printing. Color timing information is determined by reading the scene-by-scene color Cinex strips on the Unicorn Color Timer<sup>83</sup> which reads out the additive (or subtractive) corrections to be applied to the printing lights to yield a corrected color print.

General Film Laboratories also reports the installation of a detergent negative cleaning machine, a high-speed developing unit and a projection scene counter. The original concept and bread-board model was that of the Eastman Kodak Co. and their help and guidance brought this 100 ft/min device to a reality. The high-speed 35mm positive developing machine was installed and in full operation the last quarter of 1957. Operating at 250 ft/min, with a throughput time of 7 min, the machine incorporates 80°F jet-agitated solutions and spray wash, salt "hypo eliminator," Ott squeegee and impingement drybox. Elevators, hangers, frame and tanks are constructed of AISI Type 316 stainless steel and a single hydraulic lift raises the film transport unit clear of tanks and impingement drybox for service and threadup.<sup>84</sup>

A completely silent review-room footage counter has been designed and installed. This all-electronic device employs the use of the Burrough's beam switcher and "nixie" digital counting tubes. Instant reset and continuous count to 9999 are features of the instrument. When coupled to a pickup on the projector which will read out a printed cue mark at the scene changes, the

counter will also be used as a review-room scene counter to aid in editing and timing.<sup>85</sup>

Capital Film Laboratories modified and converted a normal studio recording system to the more specialized requirements of the foreign-language dubbing methods and completed a new dubbing studio.<sup>86</sup> To improve the efficiency of printing operations on large release orders for 16mm subjects of 300 ft to 1,400 ft in length, Capital built compact loop trees in an arrangement similar to conventional processing machine drying cabinets. The film transport employs sprockets and special nylon rollers and is driven by a flexible connection to an auxiliary gearbox on the printer. The trees are used with dual-head printers and will accommodate picture and sound loops as long as 1,400 ft. High production efficiency has been realized, with an average of 85% operating time on long printing runs.<sup>87</sup>

Unicorn Engineering Corp. introduced to the film laboratories four pieces of equipment. A printer robot device has been designed and installed in many laboratories for automatic setting of the printer light selection lever on the Bell & Howell Models D and J Printers. Punched paper tape containing the printer light sequence is prepared on a keyboard-perforator and this tape fed into a tape reader. The electrical signals produced in the reader are then decoded by a computer unit which in turn directs a servo unit in its manipulation of the printer level. The action of the device is considerably more rapid and accurate than manual performance and, of course, it can operate in total darkness. The robot unit is very easily installed on the printing machine and it demands no mechanical alteration of the printing equipment.<sup>81</sup>





Fig. 11. Unicorn Engineering Corp. Tape Splicer.

A special cleaner-rewind has been developed with a built-in vacuum cleaner. The unit operates on a dry-rather than wet-cleaning technique and features a new-type air and vacuum squeegee cleaning unit. A built-in time-delay circuit builds up the necessary supply of air and vacuum within a few seconds thus ensuring consistent results, while tension from core to outside of 3,000-ft film roll is maintained automatically by a torque take-up device. The machine cleans and rewinds motion-picture film in one operation at 360 ft/min.<sup>88</sup>

The Unicorn Tape Splicer (Fig. 11) is fully automatic in operation and provides a very thin splice. Pressure-sensitive Mylar-base tape wraps completely around the cut edges of the film, resulting in a strong butt splice. This wrap-around of tape is to prevent catching in processing machine parts. The 800-splice-Mylar base roll is easy to replace.

The Unicorn Color Timer serves as a visual aid to the simultaneous determination and metering of the relative balance of red, green and blue intensities, as well as total exposure in color motion-picture printing.<sup>89</sup>

The General Kinetics Model CF-1

Motion Picture Film Cleaner has recently been installed in the laboratory of Byron, Inc. Ultrasonic energy in a solvent bath is used to clean all types of motion-picture film. Grease, dust, oils, marking pencil, adhesive tape residue, and other foreign matter are reported removed completely from the film surface and from sprocket holes.<sup>90</sup>

Hollywood Film Co. introduced several new equipments.<sup>91</sup> One item is a machine to count notches in the laboratory (Fig. 12). For measuring film on the reel there is a stick which shows black-and-white film on one side and color film on the other side.

Hollywood Film's Easy Editor is a time-saving device for sound effects and music editing. It handles up to six 1,000-ft reels of either 35mm or 16mm, is motor-driven, controlled either by foot pedal or hand. The reels are driven by friction rollers and not through a common shaft, thus permitting the operator to withdraw any reel on either side quickly. The firm also introduced a differential rewind with a four-reel shaft for handling four reels, two of which are driven by the rewind gears and the other two driven by a differential gimmick. This unit accomplishes proper take-up on four reels riding on a single shaft.

Figure 13 shows the 16mm Automatic Film Splicer AFS-16, which makes butt 16mm splices with Mylar tape laid down by a sprocket. This unit has been designed especially for repairs, splicing for trial projection, splicing Du Pont Cronar film and for making a very strong general butt splice.

Hollywood Film also brought out a 16mm edge numbering machine for numbering up to 3,000-ft rolls of 16mm film in any position. This unit has a free wheeling impression roller, large sprocket drive, shrinkage roller, simplified inkwell and a torque motor take-up.

Cinema Arts-Crafts, Hollywood, manufacturers of the Cinex black-and-

white film tester, have added a multi-purpose Color Cinex to their line of film-handling equipment. With increased use of monopack color films, and the state of the art in printing these films, they designed and built the Color Scene Tester to accommodate the subtractive as well as the additive color printing systems. Color light tests, identically matched to the color printing machine hue and intensity scales, can be made from color negatives, giving the color timer accurate duplication of color printing machine results (Fig. 14).

Other Cinema Arts-Crafts developments for 1957 include: (1) a high-speed electronic notch counter available for 16mm or 35mm film, counting up to 400 notches/min, and equipped with a four-figure Veeder Root footage counter; (2) a measuring machine for footage and running time that counts in hours, minutes and seconds, equipped with engage and disengage knob, so that the counter reads only footage and time of desired sections of a reel; and (3) quick-change shaft rewinder with a positive drive and an instant release and engage feature by turning knob  $\frac{1}{4}$  turn at rear of rewind shaft. This rewinder is also available with companion flange, quick-change feature for 16, 35, or 70 mm film.<sup>92</sup>

The Hazeltine Research Corporation introduced and demonstrated an instantaneous Electronic Color-Film Analyzer. The analyzer is for color negative film and displays instantaneously a positive color picture on a color television tube when a color negative is inserted in the device. Color balance and density are adjusted by calibrated controls whose settings are used by a printer to produce a positive closely approximating the displayed picture. The device uses television techniques to simulate additively the subtractive properties of positive film in spectral taking sensitivities, gamma, contrast, and unwanted dye absorptions.<sup>93</sup>

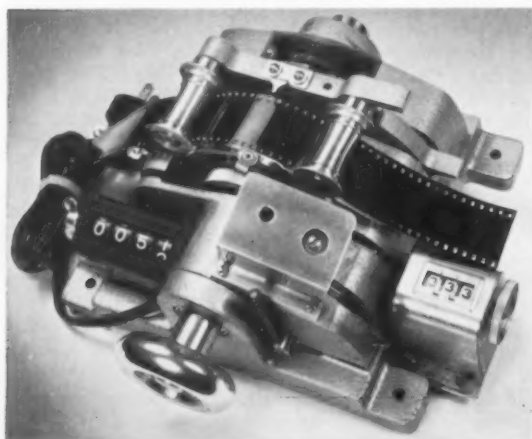


Fig. 12. Hollywood Film Co. Notch Counter.

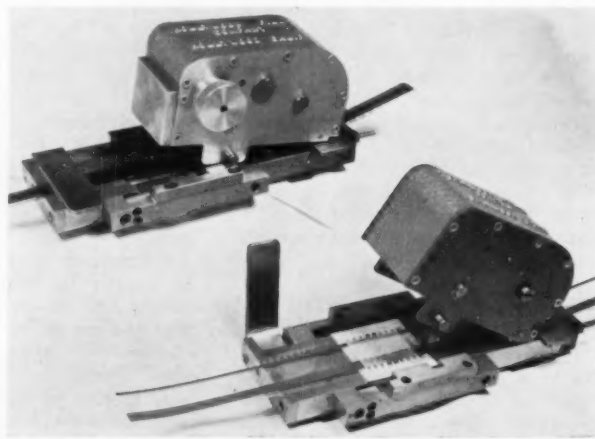


Fig. 13. Hollywood Film Co. Mylar tape Automatic Film Splicer.



The Geo. W. Colburn Laboratory designed and constructed a sensitometer of the intensity-scale type which exposes a full 16mm frame for each density step.<sup>94</sup> The light source is modulated by a series of apertures giving log E steps of 0.10. The unit is capable of exposing a single strip of 24 frames of a continuous roll of strips 200 ft in length. It has no optical parts to be kept clean or adjusted, has a normal exposure range from  $\frac{1}{8}$  to  $\frac{1}{100}$  sec and can handle all types of 16mm film from the fastest to the slowest emulsion (color internegative) and is simple to maintain.

In addition to the sensitometer, a color densitometer using a standard Densichron was developed by the Colburn Laboratory to complete the sensitometric control. Two new printers to handle the 16mm internegative-color positive process have been completed and are in operation.<sup>95</sup> One is a contact step printer which may be operated at 16 ft/sec or 30 ft/sec for white light operation; the other is a composite printer for darkroom operation at 300 ft/min. The printers are automatically controlled by aluminum cue patches on the original negatives which close the circuit when in contact with a split roller.

Consolidated Film Ind. built and installed a 35mm black-and-white spray processing machine in the Hollywood Laboratory. This machine is similar to the two installed last year at C.F.I., Burbank, Calif., to process lenticular black-and-white film for kinescope recording for NBC. The machine operates at speeds from 100 to 200 ft/min with solution temperatures at 70 F. All circulation and replenisher systems have flowmeter control.

Consolidated Film Ind. also designed and installed four color printing machines for 16mm and 35/32mm continuous contact printing. The printer features subtractive printing with a single frame pulldown control matte with two color-hue and one variable-width intensity mattes. In addition to the normal pack in the optical system, this control matte gives scene-to-scene hue and density corrections. A metallic cue patch on the original negative actuates a C.F.I. transistorized radio-frequency cuing system for automatic advance of the single-frame color and intensity control matte. The r-f cuing system depends on proximity alone to sense a tiny piece of copper foil on the original negative. Two of the printers are equipped with fader mechanisms for A and B printing, also controlled by the r-f unit. Other features of the printer include adjustable torque motor takeups, the C.F.I. roller gate and an improved lamphouse and optical system.

A newly designed optical printer was described by the Animation Equipment Corp.<sup>96</sup>

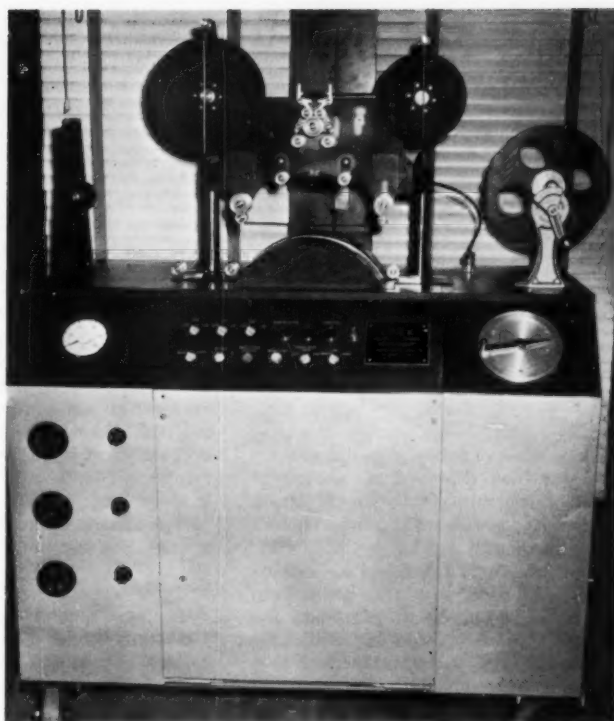


Fig. 14. Cinex automatic multipurpose Color Scene Tester.

The Filmline Corp. announced their model R-15 combination negative-positive and color processing machine for 16mm film.<sup>97</sup>

The Andre De Brie Mfg. Corp. made their Aiglonne 16mm processing machine in a size suitable for processing black-and-white reversal film.<sup>98</sup>

Anso described a method of hand-processing 16mm Anscochrome film.<sup>99</sup>

Canadian Applied Research Ltd. brought out a small processing machine for 16, 35, or 70mm film called The Automatic Tri Film Processor.<sup>100</sup>

A portable 16mm film processing machine designed and fabricated by R. D. Whitmore, Jr., under the direction of CBS Engineering and CBS News Engineering was first used commercially at the time of the Presidential Inauguration.<sup>101</sup>

A color Labmaster Model 16ARC15 for processing reversal color film was shown by Houston-Fearless.<sup>102</sup>

The Mini-Rapid 16, an automatic 16mm rapid film processor, was made available by Fairchild camera and Instrument Corp.<sup>103</sup>

Frank D. Herrnfeld designed an electromechanical light valve for motion-picture printers. The valve is actuated from a control tape without use of intervening relays.<sup>104</sup>

A fader control for continuous printing for making long or short fades and dissolves was described by Cine Video Productions.<sup>105</sup>

Du Art Film Laboratories gave a paper on spray processing in a commercial laboratory. Four machines are now in operation using impingement drying and the paper was based on experimental data and operational experience.<sup>106</sup>

A method using dielectric heating for splicing motion-picture film was explained by Upson, Meschter and Holm of Du Pont.<sup>107</sup>

A fairly simple, high-speed velvet cleaner for color negative was shown and described by Harper of Pathe Laboratories.<sup>108</sup> Pathe also developed a method of lubricating release prints with silicone, described by Brueggemann.<sup>109</sup>

The Harwald Company discussed and showed machines for automatic detection of faults in the film.<sup>110</sup>

The Fish-Schurman Corp. introduced a Hi-Speed additive color compensating head for use on continuous printers. The head uses a simple 1000-w light source.<sup>111</sup>

A Professional Film Viewer for 35mm, similar to that used in 16mm for years, was announced by The Camera Equipment Co.<sup>112</sup>

A xenon electronic flash sensitometer for use in black-and-white and color process control was described by Wyckoff and Edgerton.<sup>113</sup>

A new model of the Line Densitometer was produced by the Baldwin Instrument Co., Kent, England.<sup>114</sup>

Research programs of Eastman Kodak Co. resulted in reports on the develop-



Fig. 15. Wittnauer Cine-Twin 8mm Camera.

ment of a number of new or improved processes and laboratory equipment:

There was described a method of making superimposed titles on black-and-white or color films by a photo-resist method.<sup>113</sup>

A method was developed for making high-quality motion-picture prints from badly scratched negatives. Both the negative and print film are completely immersed at the printing aperture in a liquid having an index of refraction close to that of the gelatin and acetate support. The method was described for use by both a contact and optical printer.<sup>116</sup>

Gale and Graham told how to use a Model D printer as a sensitometer for exposing process control strips in small laboratories or for emergency work.<sup>117</sup>

A method of concentrated developer solution replenishing for Eastman Color Film was described.<sup>118</sup>

White and Lovick described a method of using glass filters in an additive light

source.<sup>119</sup> Priesthoff described an improved technique for ion-exchange recovery of Eastman Color Developers.<sup>120</sup>

Ott and Lovick reported improved contact and negative life in continuous motion-picture printers by the use of internally directed air.<sup>121</sup>

A slide-rule type of calculator has been developed to permit prediction of subtractive color printer balances from gray card densities. A timing accuracy of plus 0.03 log E was attained at the first trial in an Eastman Color Negative-Print system.<sup>122</sup>

A method of preventing Newton's Rings during contact printing of motion-picture film was described. A fine, evenly-dispersed spray of a commercially available printers' non-offset solution is applied to the negative film before printing. The function of this coating is to prevent intimate (optical) contact of the smooth surface of a negative or intermediate film with the print stock.<sup>123</sup>

#### Cameras

The most notable camera advances in 1957 seem to be in the 8mm home movie camera line. Bell & Howell introduced the world's first completely automatic 8mm movie camera to be commercially available. Longines-Wittnauer came up with an electric-drive 8mm movie camera which converts into its own projector in less than thirty seconds. Karl Heitz introduced the world's only 8mm single-lens reflex movie camera, and Bolex introduced the first 8mm movie camera with a built-in variable shutter.

The Bell & Howell 8mm Electric-Eye camera has an electric-eye which automatically sets the lens for correct

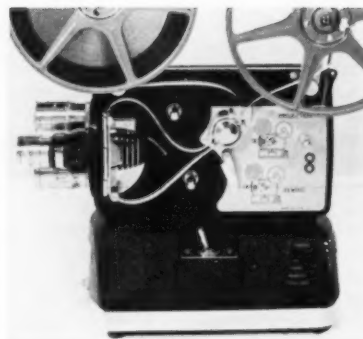


Fig. 16. Wittnauer Cine-Twin mounted on power base, ready for projection.

exposure and continually adjusts to changing light. No batteries, motor or spring are used for the automatic exposure control. The light rays striking the photoelectric cell (through the rectangular honeycomb lens at the bottom of the front plate) generate an electric current, varying with the light intensity, which is fed into an electrical meter. A gear on the meter engages and adjusts the two iris blades which create the continuously variable iris opening. A needle pointer (on the front plate below the viewfinder) indicates the f/stop at which the lens is set. The automatic exposure control can be deactivated and the lens set manually.<sup>124</sup>

The Wittnauer Cine-Twin 8mm camera is powered by three D-cell flashlight batteries and delivers a steady 16 fps through an electronic governor (Fig. 15). A tiny neon safety signal monitor lamp in the viewfinder gives constant indication of battery condition.



Fig. 17. Cutaway view of Camex Reflex 8-focusing system.



Fig. 18. Bell & Howell 240-EE 16mm Spool-Load Automatic Exposure Camera.

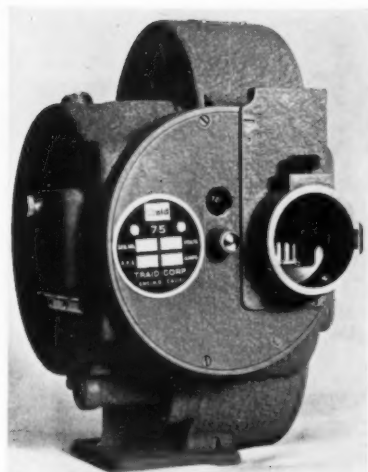


Fig. 19. Traid 75 35mm Camera.

The four-lens turret holds three filming lenses and one projection lens, and the zoom-type finder accommodates a complete range of lenses from wide-angle to telephoto. The 400-w projection lamp, reel arms, gate, film spindles and projection drive sprocket are integral parts of the camera. To ready the unit for projection the camera is positioned on the 115-v a-c power base, automatically connecting the driveshafts and lamp socket leads (Fig. 16). Raising the front 300-ft capacity reel arm automatically repositions the rotary shutter for projection and swings out of the way the baffle between the lamp and the 45° mirror behind the film gate. The base also has built-in blower for cooling.<sup>125</sup>

The French-made Camex Reflex 8-roll film camera allows parallax-free, continuous through-the-lens focusing while filming, with any lens, at any distance, at any aperture (Fig. 17). A tiny prism is mounted behind the lens on the front of the camera's shutter. When the shutter is closed, the prism directs the image into the finder system. When the shutter is open, the prism is out of the optical path. The reflex-finder eyepiece contains a cross hair and is focusable. Other advanced features include an attached back winding crank, and a single-frame counter coupled to the footage counter.<sup>126a</sup> A complete set of bayonet mount Berthiot lenses ranging from 6.25mm up to 100mm is available in addition to the new vari-focal Pan-Cinor "Zoom-type" lens (17.5mm to 70mm).<sup>126b</sup>

The Bolex B-8 Variable Shutter, which was introduced by Paillard, Inc., has all the features of the previous B-8 plus a draw-blade variable shutter which can be opened from 0° to 165°. The variable shutter allows the user to control depth of field, sharpness of action, and fade in or out of any scene while the camera is in operation.<sup>127</sup>

Later in the year, a complete line of 8mm Electric Eye-Matic cameras with Exposure Computer Lenses was introduced by the Revere Camera Company. The cameras come in single-lens or turret versions, roll film or magazine load. In these cameras, also, current is transmitted directly from the photoelectric cell to a mechanism controlling the lens iris. A setting scale that indicates the *f*/stop being used is viewed through the viewfinder. The Semi-Auto dial permits the user to override the automatic control to obtain fades and special effects.<sup>128</sup>

Bell & Howell, Keystone, Wollensak, and DeJur-Amsco all introduced an 8mm roll film movie camera having an *f*/1.9 lens, with attachments in turret. All feature simple dial-type iris setting, and the latter three, built-in filters.<sup>129</sup>

In the 16mm camera field, Bell & Howell began production on a new line of spool-loading 16mm motion-picture cameras, the 240 Series. The cameras come in single-lens, two-, and three-lens turret and automatic exposure-control versions. All models feature an automatic film-threading mechanism and a "negator-type" spring which affords a 32-ft run. The new 240-EE camera is the first spool-load 16mm movie camera to incorporate the electric eye system, which automatically sets the lens for proper exposure (Fig. 18).<sup>130</sup>

The Austrian-made Eumig C-16 Electronic-Eye 16mm camera was introduced by Unimark Photo, Inc. This semiautomatic exposure camera features a built-in electronic eye that automatically adjusts to all film and shutter speeds, simple drop-in spool loading, built-in exposure meter and an *f*/1.9 lens.<sup>131</sup>

In keeping with the growing need for instrumentation cameras, the Traid Corporation introduced the new Traid 75 Camera (Fig. 19). This 35mm camera operates over the range of 20 to 80 fps by means of change gears, and incorporates a variable shutter device over the range of 0 to 160°.<sup>132</sup>

Some notable camera adaptations and accessories were introduced in 1957. Among these is the 400-ft magazine adaptation for the Kodak K-100 16mm movie camera made available by PAR Products Corp. It requires little modification of the camera and permits use of 100-ft spools in the normal manner, with or without the 400-ft magazine in place.<sup>133</sup>

Birns & Sawyer, in conjunction with U. S. Navy and Hollywood cameramen, designed a watertight housing called the Aquarri for the Arriflex 16 camera. Made of cast aluminum, with balance plates to compensate for buoyancy in either salt or fresh water, it has been pretested to 160-ft depths.<sup>134</sup>

An adaptable automatic exposure control was shown by Traid Corp.<sup>135</sup>

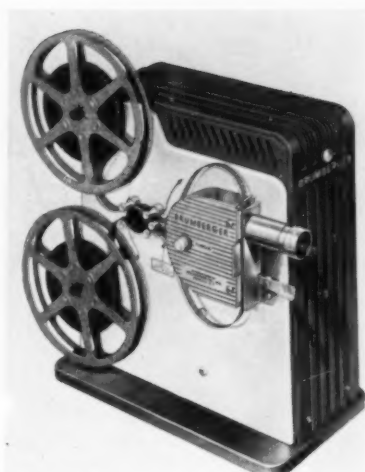


Fig. 20. Low-Cost Brumberger No. 1503 8mm projector.

The Perkin-Elmer Corp. were building twelve special cameras with the most difficult optical system ever attempted — that of photographing an object the size of a basketball at twice the speed of sound 250 miles distant. Those were for the International Geophysical Year experiment.<sup>136</sup>

In Chicago, the Magnetic Sound Camera Corp. began distribution of a 16mm single-system magnetic sound camera.<sup>137</sup>

Another instrumentation camera called the Type 232 Mark 7 camera using 35mm was made by Canadian Applied Research Ltd.<sup>138</sup>

A magnetic sound head adaptation for the Arriflex 16mm camera was introduced by Rank Precision Industries Ltd. This is a single-system camera.<sup>139</sup>

A new line of 8mm movie equipment, called the Cinekon, is being manufactured by Taylor, Pearson & Cason Ltd., Vancouver, B.C.<sup>140</sup>

Eastman Kodak Co. brought out several new cameras intended primarily for the amateur market. The magazine loading Medallion 8 movie camera line was extended to four models by the introduction of the Kodak Medallion 8 movie camera, *f*/1.9, and the Kodak Medallion 8 movie camera Turret *f*/1.9.

#### Projectors

In 1957, the trend in new 16mm motion-picture projectors was toward brighter pictures and more powerful and improved sound systems. In the 8mm field, where increased illumination and synchronized sound systems were also noted, there appeared an extremely low-cost home movie projector which had features of many more expensive models.

The Brumberger No. 1503 (Fig. 20) is a full-size 8mm projector with a 300-w lamp, blower cooling, and a 200-



Fig. 21. Eumig P-8 Imperial 8mm Projector.



Fig. 22. "Custom 1000" 8mm projector, DeJur-Amsco Corp.

ft capacity. Other features are all-metal construction, rapid motor rewind, and nylon bushings for quiet operation.<sup>141</sup>

Two 8mm projectors were announced which featured sound synchronization systems. The Austrian-made Eumig P-8 Imperial Projector for 8mm motion pictures was introduced by Unimark Photo, Inc. (Fig. 21). It is compact, lightweight, and briefcase size, and features a 12-v optical system and light source equal to 500 w. Built-in sound synchronization adapts to a horizontal or vertical tape recorder.<sup>142</sup> The Bolex M-8 Synchromat, developed for 8mm synchronized sound projection, was announced by Paillard Products, Inc. The electromechanical synchronizer may be used with the Bolex M-8 projector and any standard model horizontal tape recorder. When connected, the speed at which the film is projected is controlled by the speed of the magnetic tape, resulting in perfect synchronization.<sup>143</sup>

DeJur-Amsco introduced a 1000-w 8mm projector — The Custom 1000 (Fig. 22). Special features are a detachable splicer mounted on the base, an automatically retracting power cord, and forward, reverse and variable speed controls on a single panel.<sup>144</sup>

The new Wollensak Model 715 8mm projector features pushbutton controls, removable self-contained film splicer, 750-w illumination, still projection, rheostat speed control, and a built-in storage compartment for three 400-ft reels.<sup>145</sup>

Bell & Howell announced the addition of all-gear driven enclosed reel arms in their lower-priced Monterey 8mm movie projector.<sup>146</sup>

In the 16mm field, RCA announced the development of two new motion-picture sound projectors utilizing the new 1200-w projection lamp. The first is a dual case 15-w unit with separate speaker for audiences of about 1000 (Fig. 23). The second, a 7-w model, has a single case with built-in speaker for audiences to 400. Both have loading

capacities of 2000 ft and feature built-in lubrication, nylon sprocket shoes and synthetic-sapphire pressure shoes.<sup>147</sup>

A 50% increase in power and distortion-free sound at high levels are features of Bell & Howell's newest Filmo-sound 16mm magnetic-recording projector. The 302 enables the user to record his own soundtrack on film as well as to project both magnetic and optical sound and silent films. New features are a 15-w amplifier, dual recording-level lamps, separate tone controls for treble and bass, a monitor input jack, and a built-in interlock which automatically prevents accidental erasure. Available as an accessory are a record-erase lock and key to prevent unauthorized recording or erasure (Fig. 24).<sup>148</sup>

Victor Animatograph Corp. announced a 16mm projector with a new optical system. Said to put 38% more light on the screen under adverse room darkening conditions, it is called the Hi-Lite Optical System and features a new Mark II, two-interruption shutter (Fig. 25).<sup>149</sup>

A new Eastman 16mm Projector, Model 25B, may be adapted for magnetic as well as optical sound. An accessory kit converts it for interchangeable or simultaneously mixed handling of either magnetic or optical soundtracks. Power output for the main amplifier is 30 w. It is available with either tungsten or arc illumination.<sup>150</sup>

Wollensak introduced a new 16mm Motion Picture Analysis Projector for the study and analysis of subjects filmed by high-speed motion-picture cameras. A special feature allows the film to be advanced one frame at a time at the projector or it can be remotely controlled at the screen.<sup>151</sup>

A 16mm film projector called the

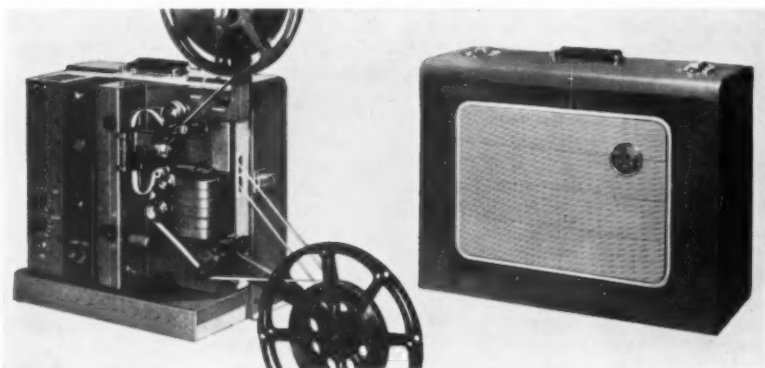


Fig. 23. The Dual-Case RCA 400 Senior Sound Projector.





Fig. 24. Bell & Howell Filmosound 302 Magnetic-Recording 16mm Sound Projector.

PerceptoScope was developed by Perceptual Development Laboratories, Inc. It combines the uses of slide and strip-film projectors, tachistoscopes, motion-picture projectors and reading accelerators or pacers. Other features are: projection of two films simultaneously, one superimposed over the other; quick stopping or starting; manual or automatic operation; automatic rewind; selection of 19 projection speeds from 1 to 24 frames/sec. All functions are controlled from a hand-sized remote-control unit on about 25 ft of cable. It uses a 1000-w lamp.

In the projector field, Eastman Kodak manufactured a variable-speed model of the Cine-Kodak show-time 8 projector. A new model of the 25 professional 16mm projector was introduced in 1957. It is called the 25B and provides 20% more light than previous models. A magnetic sound play track kit was offered for the 250 and 275 Kodak television projectors. It is designed to play full- or half-width tracks (Fig. 26).<sup>112</sup>

#### Kinescope Recording

Black-and-white kinescope recording did not benefit from any commercially usable technical advancement in the

year 1957. Due to the use of video tape for recording and reproduction of time-zone delay broadcasting, a marked reduction in the quantity of kinescope recording occurred at all three network

installations in the Los Angeles area, with a further reduction in the offing as soon as more video tape machines become available.

The only new kinescope development reported to the Committee is a device described as an "Ultrasonic Light Modulator," designed and built by the Fairchild Controls Corp. for airborne, photographic recording of radar information.<sup>113</sup> It is reported as having better resolution, contrast, and grayscale capabilities than presently available kinescopes. In this system the film is exposed in a continuous-motion recorder and reproduced by means of a continuous-motion, flying-spot scanner. If adaptable to television standards, this development appears to hold promise of improving the quality of photographic recording of television signals.

Considerable improvement in picture quality was made throughout the year by NBC Burbank in recording and reproduction of live color TV programming by means of lenticular, or embossed, film.<sup>114</sup> This procedure remained throughout the year as the only means employed for network time-zone delay of live color programming.

Three other means have been employed for recording of color television on a local, or closed-circuit, basis. At the Walter Reed Army Medical Center in Washington, D.C., a triniscope monitor employing red, green and blue phosphor kinescopes was utilized to provide a superimposed color image which was photographed by a camera containing 16mm subtractive color film. Color prints were then made and distributed to medical units as training films.<sup>115</sup> The triniscope monitor is available commercially from the Telechrome Company.

Experimental work has been done at

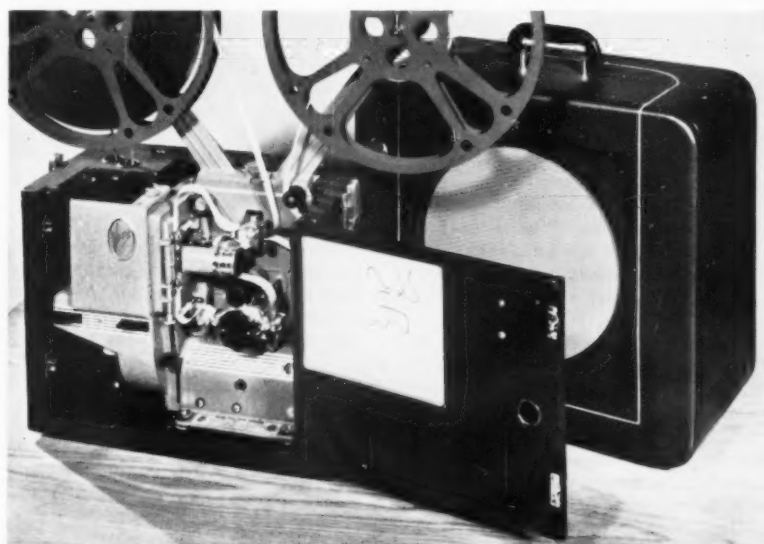


Fig. 25. Victor Animatograph Corp. 16mm Sound Projector with Hi-Lite Optical System.



veloped using the procedure similar to that outlined above.<sup>158</sup>

*Century Lighting, Inc.*

Century Lighting reported several new items: the new light called the "Hot Spot" and made without a lens, depends upon a carefully calculated compound reflector that combines the hyperboloid and elliptical shapes into a multiple of satin-surfaced mirrors. The spread ranges between 30° and 60° with an efficiency claimed to be two to three times that of the conventional Fresnel lens spotlights of similar wattage. The first design is 5000-w size. It is recommended for overhead backlighting, side lighting and front lighting. The Hot Spot is designed for long throws — delivering 275 ft-c at 50-ft distance, and 100 ft-c at 75-ft distance at spot focus and 50 to 20, respectively, at full-flood position. Lighting directors have used it to illuminate large sky drops with success. A diffuser is attached for such applications and this principle is being considered for units of smaller and larger wattages.

A new Fresnel lens was developed with a spread of two in one direction to one in the other direction. Known as the 2 to 1 Fresnel lens, this type of unit is intended to reduce the use of the "barn door."

A new 5000-w elliptical follow spotlight was introduced as the first such unit with a built-in system of rapid acting iris and coupled horizontal and vertical shutters. The 5-kw Lekolite is mounted on a three-castered tripod base that contains a hydraulic pressurized telescopic stand for easy and quick raising and lowering in a range from 3 to 5 ft. The lamp burns in a base-up position and is air cooled by means of self-contained and noiseless blowers, all operating under normal voltage.

A pre-set dimmer reloading system was introduced whereby lighting control dimmers in a programmed system may be re-used several times during a TV production. Several mercury relays are patched into load circuits and connected at the cross-connect panel to the same dimmer. A series of programmed pre-set panels permits the operation of the relays in any pre-determined pattern by pressing one switch. It is anticipated that a properly equipped black-and-white control system can be expected to meet color requirements by the addition of this facility. This initial installation was made for the four CBS-TV studios located in Hollywood.

Century Lighting introduced a Color Value Wall which provides a smooth, luminous background of any desired color.<sup>159</sup>

*General Electric Company*

The General Electric Co. Lamp Division at an SMPTE meeting in Hollywood on December 10, 1957 announced a new 10-kw/G96 lamp for motion-pic-

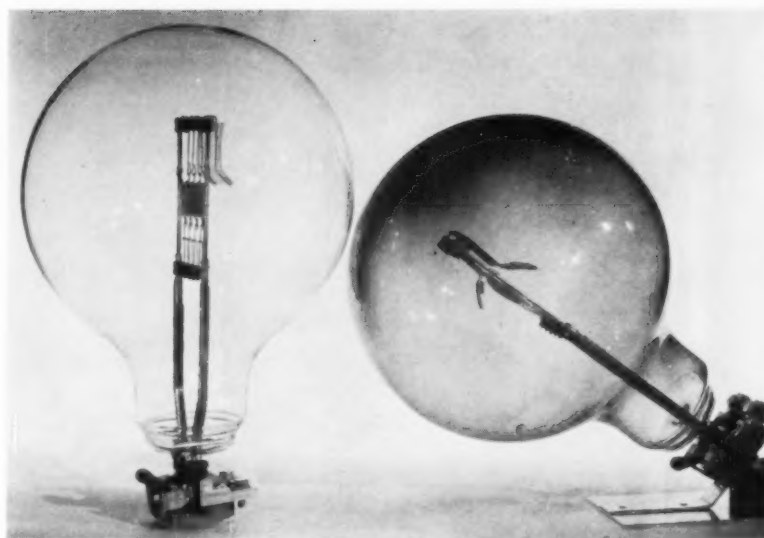


Fig. 28. Left, new gridded 10-kw/G96 lamp; right, lamp shown after burning in hot unit to filament failure, with cleaning every 16 hours (General Electric Co.).

ture set lighting. This lamp far out-performs its predecessor in light output and useful life.<sup>160</sup>

General Electric research laboratories solved the problem of bulging bulbs and heat cracking by the development of a new material for a screen grid and proper placement of it so as to collect most of the blackening before it deposited on the glass bulb. Without this blackening, the glass temperature, even in hot units, apparently does not exceed the softening point of glass so that the bulb retains its original shape, or very close to it (Fig. 28). This means, then, that the 10,000-w lamps may now be operated, if desired, for full filament design life of 75 hr.

*Mole-Richardson Co.*

The Company's new products included the Mole-Richardson Type 1431 Overhead Strip (Fig. 29) designed with minimum weight.

The Moleflexor was developed with quick-folding pedestal, reduced weight, and kits of tools and materials available for repair of reflecting surfaces.<sup>161</sup>

Ski-hi Pedestals were designed as follows: Type 1581 Baby Size, four telescop-

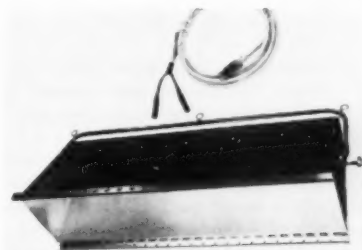


Fig. 29. Mole-Richardson Type 1431 Five-Light Overhead Strip.

ing lifts, 46 in. low to 162 in. high; Type 1561 Junior Size, three telescoping lifts, 47 in. low to 137 in. high; Type 1571 Senior Size, three telescoping lifts, 47 in. low to 137 in. high.

Low Pedestals are: Type 1391 Baby Size, one telescoping lift, 20 in. low to 33 in. high; Type 1411 Junior Size, one telescoping lift, 22 in. low to 32 in. high.

Grip equipment includes: "butterflies" with knock-down frame; Type 1731 Junior Trombone;<sup>162</sup> Type 1721 Junior Wall Plate; and Type 1671 Junior Extension Arm.

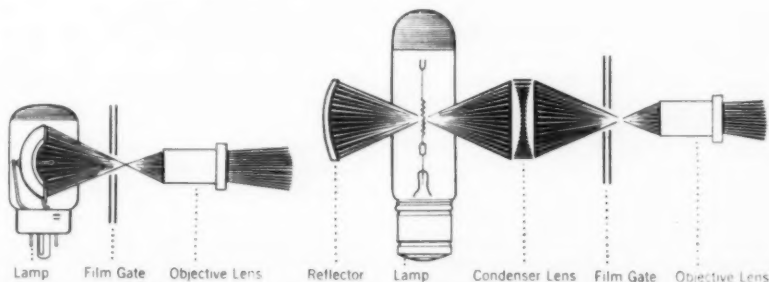


Fig. 30. Sylvania Tru-Flector projector light system.

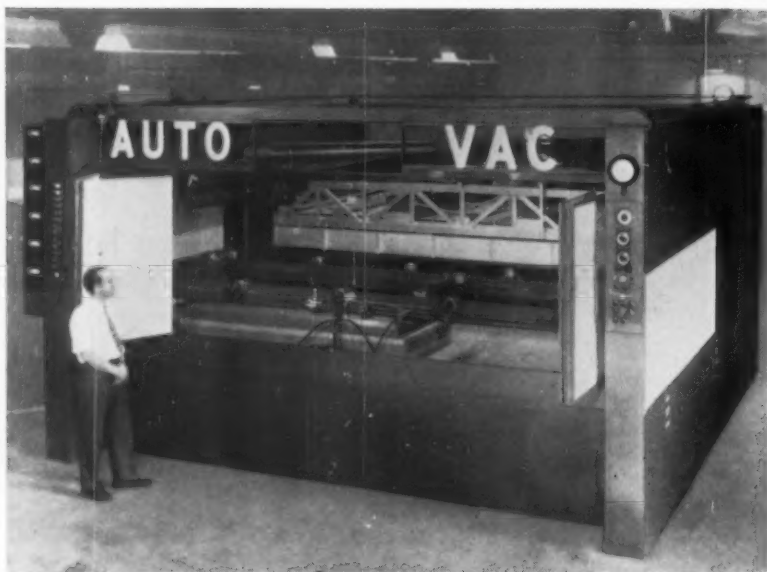


Fig. 31. Type of vacuum heat forming machine used for NBC Studios, Brooklyn.

#### Other Lighting Equipment

Shown by Natural Lighting Corp. was the Grover Grip, designed to attach bulky lighting equipment to large spans.<sup>163</sup>

The J. G. McAlister Inc. announced a spring-loaded toggle-operated socket which is reported to eliminate arcing of any type of bipole lamp.<sup>164</sup>

Westinghouse introduced a 1200-w T 12 projector lamp to be interchangeable with 1000-w lamps.<sup>165</sup>

Sylvania Electric Products Inc. brought out a new lamp that can be called revolutionary. Called the Tru-Flector 8mm lamp, it uses 150 w and does away with the conventional condenser system in an 8mm projector, and is said to equal a 500-w conventional system (Fig. 30).<sup>166</sup>

#### Studio Set Construction

Large structural units for NBC Studios, Brooklyn, N. Y., have been made by Emhart Mfg. Co., which employs vacuum heat forming equipment in the world's largest operation of this sort.<sup>167</sup> The forming area is 12 ft long and 6 ft wide. The Studio fabricates all brick and stone wall imitations, columns and many other items from nonflammable vinyl sheets 16 mils thick (Fig. 31). The vinyl material is supplied in rolls 75 in. wide and 160 yd long. The drawn fabricate is nailed to a light wooden frame to give it the required rigidity. The molds for these large sheets are obtained by first cutting a foundation block of styro-foam 10 ft long, 6 ft wide and approximately 10 in. high. The surface texture and details are then troweled in with hydrocal plaster. This allows the use of lightweight molds which can be easily

transported and placed in position by two persons (Fig. 32).

The Hollywood studios have been investigating the advantages of replacing hard wooden flats with lightweight panels consisting of a plastic foam core, one to two inches thick, surfaced on both sides with thin veneer or waterproofed paper-board.<sup>168</sup> The trend seems to be toward lightweight structural units.

Epoxy resins have been introduced to the studios as materials for fabrication of structural units, props, and as ingredients of functional coatings. Low shrinkage and high chemical resistance are outstanding advantages. Recent availability of curing aids or "hardeners" which do not irritate the skin has removed one of the obstacles to the acceptance of these resins for studio applications.

Flexible polyester resins are used in a recently developed method of casting compoundly shaped stair railings. First, a straight plaster mold is made of the required pattern of the railing. After casting the duplicate railing in flexible polyester, the fabricate is bent into the desired shape and held in that shape until it becomes sufficiently rigid to retain the curvature.<sup>169</sup>

A new product for falling snow effects, obtained by shredding and hammer-milling polyethylene film, has practically displaced all earlier materials.<sup>170</sup>

Many new materials have been introduced, among them:

*Pressure-sensitive silicone adhesive*<sup>171</sup> holds its tack and stays flexible over a temperature range of minus 100 F to plus 500 F. It sticks to almost any surface, including teflon, polyethylene and vinyl plastics.

*Cetyl and oleyl alcohol* are insoluble in water and will form an invisible, thin continuous film on the surface of the

water which effectively reduces loss by evaporation.<sup>171</sup>

A new nontoxic lawn paint can be used on location to spray trees, shrubbery, meadows and ground where the impression of green vegetation is desired.<sup>172</sup>

Two silicone rubbers<sup>173</sup> of special interest to make-up departments have been developed. A small amount of catalyst added to one type will combine to form a soft, resilient foam rubber within minutes at room temperature. The other yields a firm, elastic substance under similar conditions, which can be used to obtain resilient films for various purposes in make-up technology, or to produce flexible, shrink-free molds.

*Biologically stable casein* has been developed to eliminate the chief disadvantage of casein paints, that of early spoiling due to sensitivity to mold attack.<sup>174</sup>

#### Pay Television

There was considerable activity in the pay TV field during the year. Systems proposed by various companies were based on "scrambled" programs with a decoding device made available to subscribers. Such firms as Zenith, Skiatron and Telemeter entered the field with some form of the "scrambled program" method. A variation of pay TV was introduced at Bartlesville, Okla. Known as "cable-TV" or Telemovies, the programs are broadcast over a cable network to the homes of subscribers. There are two channels, one carrying



Fig. 32. Lightweight, vacuum heat formed column.



"variety" programs and the other feature pictures, many of which are first-run. The initial subscription rate of \$9.50 per month was later lowered to \$4.50.

Pay-TV encountered considerable opposition from the outset. Federal Communications Commission set up provisions for limited tests of various pay-TV methods, but continuing opposition from influential members of Congress appears to have halted immediate progress in this field.

There was another development, the making of a recording of program identity at the studio. A number of companies, including Jerrold Electronics, Skiatron, General Precision Equipment and Digitronics, announced developments in this field. In all of these systems, the customer is billed on the basis of a signal transmitted from the receiver back to the studio at the time of program purchase.

More recently, a subscription TV system using existing antennas was announced in New York by Subscriber-vision.<sup>174</sup>

#### Closed-Circuit TV

Closed-circuit TV took another step forward as this market continued to increase. Several cities experimented with closed-circuit TV for road patrolling purposes.<sup>175</sup>

Closed-Circuit Telecasting System of New York demonstrated in Chicago large-screen color TV for industrial purposes.<sup>176</sup>

The Bell Telephone Co. of Pennsylvania, in cooperation with General Precision Laboratory Inc., and Dage TV Div. of Thompson Products Inc., has perfected the means whereby the transmission of narrowband TV pictures over ordinary telephone cable pairs is now feasible.<sup>177</sup>

General Precision Laboratory announced GPL Model PD-500 self-contained closed-circuit TV camera.<sup>178</sup>

General Electric used closed-circuit TV to align turbine shells.<sup>179</sup> The use of closed-circuit TV for traffic control was proposed by General Electric and a nationwide training program for closed-circuit TV technicians was conducted by General Electric and RCA.<sup>179</sup>

A single-cable Industrial TV Control System which combines visual observation with remote control throughout an entire plant was introduced by Jerrold Electronics Corp.<sup>180</sup>

The East-West TV Network offered two closed-circuit package deals, one reaching nine cities and the other reaching 11 cities.<sup>179</sup>

#### Television Networks

*Growth of Networks and Off-the-Air Pickup Services:* During 1957 about 550 channel miles of TV facilities were added to U.S. networks, bringing the total to about 77,460 channel miles. This was

brought about by construction of 1,450 channel miles of radio relay channels and the removal of 900 channel miles of coaxial cable from television service. By the end of the year network service was available to 513 stations in 348 cities — a growth of 85 stations and 59 cities since 1956. During this period the total channel miles of the network equipped for color transmission increased to about 73,335. Color transmission was extended to 12 stations and 8 cities, thus linking 231 stations in 160 cities to the color network. Off-the-air television service has been extended to seven more customers of the Bell System, bringing the total to 15 customers receiving this type of service.

*L3 Coaxial Facilities:* Several short L1 coaxial carrier routes in the TV networks were converted to the broader band L3 coaxial system during 1957 and one 1400-mile route was converted for initial service on January 1, 1958. By the end of 1957, however, there was a total of 2,763 channel miles of L3 coaxial facilities in the TV networks. The bandwidth of the L3 coaxial carrier system extends to about 8 mc. When it is used for television, 600 telephone message circuits occupy the lower frequency range with the TV channel operating in the range above about 4 mc.

*Miami-Havana Radio System:* This system represents the first attempt at TV transmission using the tropospheric propagation method of transmission. It consists of two links of TD-2 microwave, totalling 37 miles, out of Miami to Florida City, a 185-mile over-the-horizon link from there to Guanabo, Cuba, and a 14-mile TD-2 link from Guanabo to Havana. The standard TD-2 FM signal is passed to and from the over-the-horizon equipment at 70-mc IF. The FM terminals for both telephone and television are at Miami and Havana. A brief description was included in the *Journal* article by Halstead on "NARCOM Plan for Transatlantic Television."<sup>181</sup> Satisfactory transmission of monochrome signals has been achieved; however, limited tests indicate that more stability in the system at the high-frequency end of the TV band is necessary for satisfactory color transmission.

*Closed-Circuit Educational Network:* The experimental project being carried on by the Washington County Board of Education, Hagerstown, Md., is proving a success. The original network has been extended to provide six TV channels and service to 23 schools. The additional channels were obtained by transmitting in the range below 50 mc. In the schools they appear as Channels 7, 9 and 11. The Bell System  $\frac{3}{8}$ -in. coaxial cable, used in extending the system, has proved most satisfactory. Plans now call for further

extension of this service during the summer of 1958. At present there are 33 circuit miles which will grow to 142 circuit miles serving 48 schools upon completion of this system.<sup>182</sup>

*Closed-Circuit Theater Network:* During September 1957 a closed-circuit theater television network went into service in Bartlesville, Okla. Although the system was not designed or constructed by the Bell System, the Southwestern Bell Telephone Co. has since purchased the outside plant consisting of coaxial cables and amplifiers.

#### Color Television

Activity in the color TV broadcasting field during 1957 has concentrated on the solution of problems related to color picture fidelity, large-scale network operations, time-zone delay recording and flexibility in staging.

Methods of setting up and operating color cameras have been standardized, showing the possibility of holding color or skin tone rendition between cameras within very narrow limits.<sup>183</sup> Split-screen techniques for combining East and West Coast color pictures in the same broadcast signal have been used effectively and extensively. Closed-circuit recording and playback of color signals on quadruplex video tape have been demonstrated to broadcasters on a large scale. Such color video tape facilities are essential for time-delay program storage, particularly in the West Coast area.

Chroma-keying, a technique of electronically combining the outputs of two color cameras, has added a powerful tool in staging and production of color programs. It was developed during 1957 and has been used widely in programming.<sup>184</sup>

In certain areas color programs have increased, particularly in afternoon and evening time slots. The number of stations which are now equipped to transmit network color is 231. Color cameras for live originations are now in 44 stations, and 97 color film reproducing cameras are now installed.<sup>185</sup>

A new color receiver series has simplified tuning characteristics, has fewer operating controls and a special gray-glass filter providing effective suppression of the effects of ambient lighting.<sup>186</sup> The total number of color receivers now in the field exceeds 300,000.

Color programming during the past year has been concentrating on increased breadth and flexibility in production for live programs and improvement in color and monochrome rendition for both live and film subjects. A field which has received attention by several investigators is that of scenic design. It is obvious that one can pick colors which are very effective when viewed in a color receiver, but which may have identical or nearly identical luminance

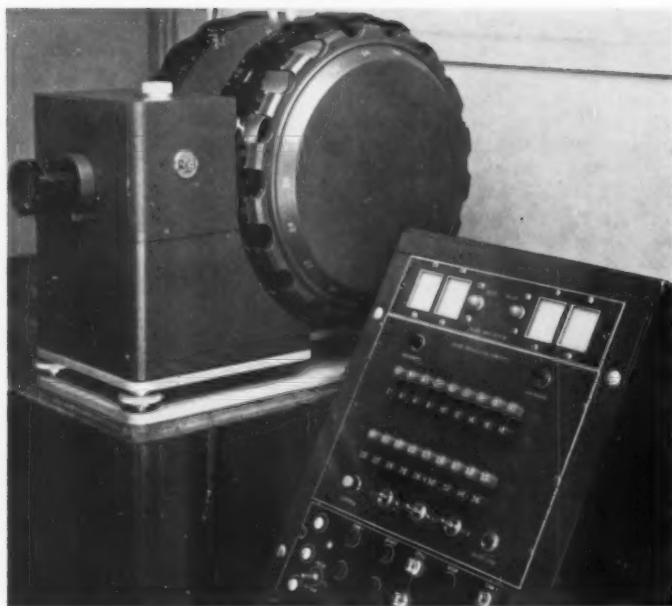


Fig. 33. The RCA TP-8A Random-Access Color Slide Projector.

or gray-scale values when viewed on monochrome TV receivers. In such a case the consequences can be disastrous. Means for logical selection of colors have been proposed and demonstrated.<sup>187,188</sup>

Field tests and evaluations are continuing on the use of color test signals introduced during the vertical blanking period. Such signals are intended as a continuous check on TV system and network performance.<sup>189</sup>

#### Broadcast Color TV Equipment

A new color monitor, the TM-21, was introduced for broadcast use by RCA. The monitor is entirely self-calibrating, making it possible to standardize test and operating conditions. Stability of performance has received special attention.<sup>190</sup>

A random-access color slide projector, the TP-8A, was developed for broadcast use. It is based on the TP-7A introduced in 1956, but allows the operator to random-select any one of 36 color or monochrome slides. Such a feature is essential for automatic-program development. (Fig. 33).<sup>191</sup>

A new image-orthicon TV pickup tube was announced. The RCA 7037 is designed especially for color and has double the sensitivity of other color tubes, made possible by a new tri-alkali photo-cathode.<sup>192</sup>

Several manufacturers have introduced "orbiters" or image-orthicon tube savers for color and monochrome cameras. The basic feature of such devices involves continuous motion of the optical or electrical image in the image-orthicon so as to minimize "burn" or retentivity effects.<sup>189-193</sup>

of smaller size, improved optics and improved circuitry are cited.<sup>196</sup>

A simultaneous color switcher and special effects equipment were publicly demonstrated and presented by Philco.<sup>197</sup>

**Color TV Recording:** During the past year RCA demonstrated a quadruplex video-tape recorder for color and monochrome, extensive closed-circuit coast-to-coast demonstrations having excellent results. Such equipment is essential to provide time-delay color program storage and playback facilities, especially on the West Coast (Fig. 34). Plans for manufacture of these units have already been announced.<sup>198</sup>

**Closed-Circuit Color:** A large-scale color TV information and data transmission system was installed and placed in operation at Strategic Air Command (SAC) in Omaha, Neb.<sup>199</sup> Five live color cameras, a 3-V color film chain, an elaborate switching and distribution system are used to drive closed-circuit monitors.

#### Automation in Television

Manufacturers of TV equipment were concerned with perfecting automatic equipment for operating stations. An

A new color camera based on the image-orthicon has been announced by the General Electric Company. Features

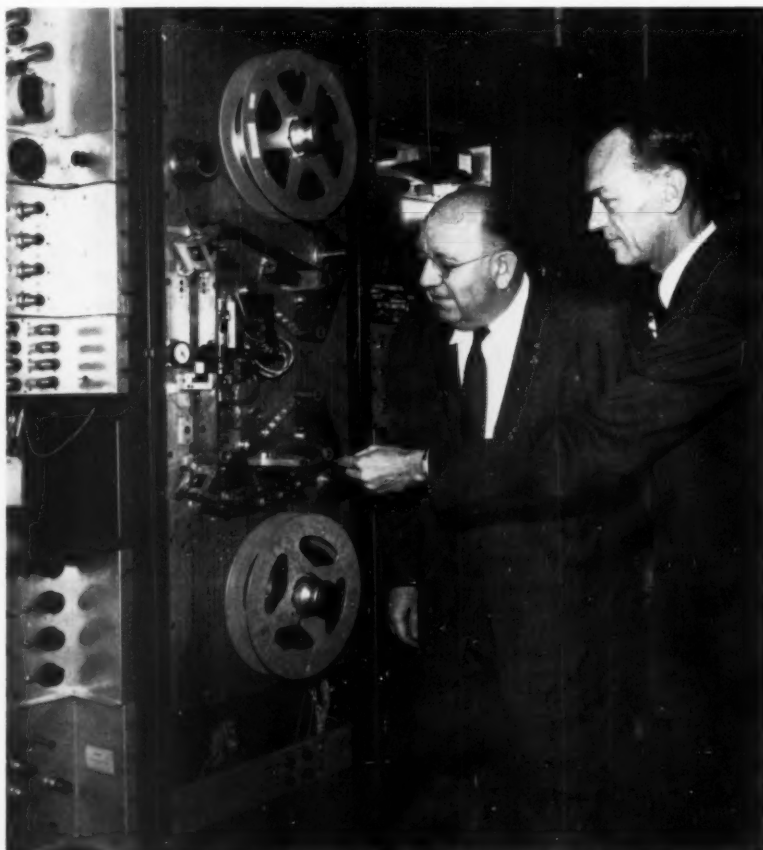


Fig. 34. RCA quadruplex video-tape recorder for color and monochrome.

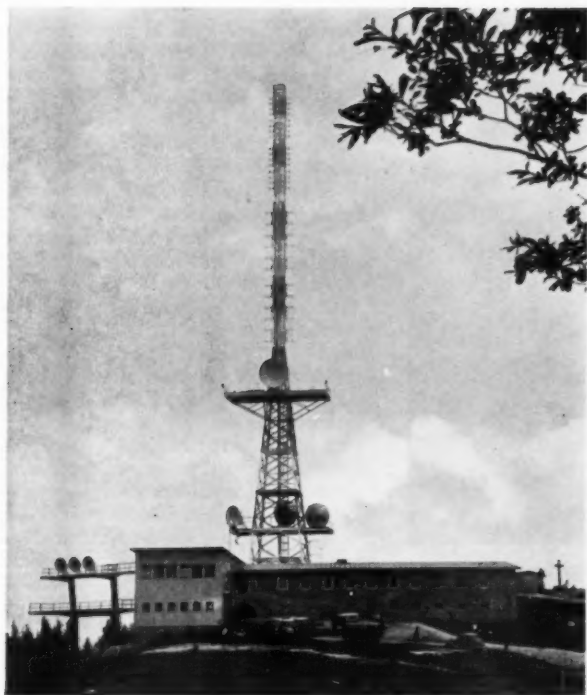


Fig. 35. FM and TV transmitter on top of Gaisberg, Salzburg, Austria.

automatic gain control unit was described by the Technical Products Dept. of General Electric Co.<sup>200</sup>

Ampex Corp. was working on a tape system for making automatic announcements on a TV program.<sup>201</sup>

Automatic cuing of TV film projection has been studied and developed by RCA.<sup>202</sup>

General Electric has developed an automatic program control system for TV as well as FM and AM radio, with perforated tape or cards to control the system.<sup>203</sup>

#### Television in Europe

##### *Eurovision*

Eleven countries are now taking part in the exchange of live TV programs.<sup>204</sup> The more complicated hook-ups are supervised by the Technical Co-ordination Centre established in Brussels by the European Broadcasting Union.

The standards converters in the Continental Television Link Station at Swingate near Dover now use  $4\frac{1}{2}$ -in. image-orthicon cameras. This has improved the performance of the converters to such a degree that the conversion process now adds negligible distortion to the picture signals. The improvement is partly due to the better signal-to-noise ratio of the  $4\frac{1}{2}$ -in. tube, as compared to the 3-in. tube, and partly to the greater amplitude at which the "bend" occurs in the transfer characteristic of the larger tube. This means that an output signal

may be taken from the tube at increased level, while still remaining within the region of linear operation in order to obtain the maximum storage effect. It is necessary to achieve maximum storage in order to minimize the occurrence of moving black bars at a recurrence rate equal to the difference in the frame frequencies of the two systems.

The contrast ratio of the picture "viewed" by the conversion camera must be restricted to about 5 to 1 in order to keep the transfer characteristic as nearly linear as possible.

Besides the conversion of incoming signals from 819 or 625 lines to 405 lines, outgoing signals are now being converted from 405 to 625 lines at Swingate using 625-line cameras with  $4\frac{1}{2}$ -in. tubes.

The BBC is now responsible for the conversion of all outgoing signals from the United Kingdom which are required for European distribution on 625 lines, but conversion to the French 819-line standard is done in France.<sup>205</sup>

Until recently, only the big European countries had important television interests; in 1957, however, the TV service of the smaller countries was improving and made considerable progress. Great Britain continues far ahead, with more than seven million viewers; then comes Germany with more than one million. Color television is still at an

experimental stage in Europe. At the beginning of 1957, color TV was demonstrated successfully in the United Kingdom. In July 1957, an interesting symposium on color television was held in Paris. The network of Eurovision has grown last year, with Austria and Sweden connected to it.

##### *Progress in Smaller Countries*

At the end of 1957, in Austria one TV studio and six television transmitters (Fig. 35) were in use. The number of viewers was about 15,000. In Greece, television has not yet been introduced, but studies are underway. Also in Luxembourg television has grown. There is one transmitter and about 3000 viewers. In Norway a proposal by the Board of Norsk Rikskringkasting and the Ministry of Education and Ecclesiastical Affairs for the introduction of television has been approved. Time for the introduction of television into Norway has come and the technical and economic facilities are available. Regular television transmissions will start in 1960. Portugal has had an experimental TV service for about a year. Two of the five planned transmitters are in service: Lisbon and Coimbra. Transmitters in Porto, Montejunto and Foia are about ready. With these five transmitters, about 80% of the population of Portugal will be reached.

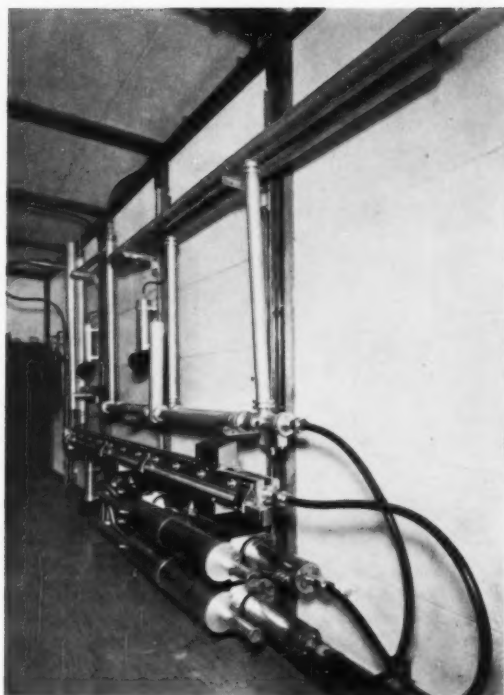


Fig. 36. TV transmitter from Brown, Boveri at the Dôle near Geneva. From bottom up: Diplexer for 8-kw video transmitter and 1.6-kw FM phonetransmitter; transmission line for measuring frequencies and impedances; vestigial sideband filter; also, water-cooled dummy antenna.



Fig. 37. The Post, Telephone and Telegraph authorities of Switzerland are placing several transmitters for TV, FM broadcast and mobile telephone services on top of the Sântis. It is reported to be the highest TV transmitter in Europe (8200 ft).

In *Spain*, a transmitter is in operation in Madrid; another station is planned for Barcelona. There are about 10,000 televiewers. License fees are smaller for receivers up to 14 in. The regular TV service in *Sweden* was introduced in the autumn of 1956. At present, there are three transmitters in service: Stockholm, Norrköping and Göteborg. At the end of 1957, the number of televiewers exceeded 70,000. At present four transmitters (Fig. 36) are in service in *Switzerland*. The transmitter on the Sântis (Fig. 37) will be put in service within a few months. The number of televiewers amounts to some 30,000.<sup>206</sup>

Television in the larger European countries is covered separately in the sections for those countries.

#### High-Speed Photography

Two satellites orbiting high above the earth in 1957 made this an unusually significant year from the standpoint of high-speed photography and photographic instrumentation. In an important paper published in this *Journal* (March 1957), "Requirements for Cameras in Guided

Missiles," by Robert M. Betty, Lockheed Aircraft Missile Systems Div., the immense problems facing workers in this field were carefully outlined.<sup>207</sup>

One example of the "new look" in optical instrumentation called for in Mr. Betty's paper is the "Supersonic" lens developed by Zoomar Corp. during this year (Fig. 38). These optical systems permit cameras to be mounted inside high-speed aircraft or unmanned missiles, with only a quartz window exposed to the effects of thermodynamic heating at high speeds. Variations of this design have also been made to include rapid rotation of the quartz window in the airstream or into a liquid coolant to permit operation up into the region of possibly Mach 10.

During 1957 the film capacity of the widely used gun-camera type of instrumentation was doubled as Bell & Howell introduced a 100-ft displacement-type magazine for its N-9 aircraft camera. While possibly not as spectacular a development as the Supersonic lenses mentioned above, availability of 100-ft capacity gun cameras with little increase in overall camera dimensions may open

interesting new areas of application in the missile field, where space is always at a premium (Fig. 39).

Several new models of rotating prism cameras were introduced during 1957, including: 16mm Fairchild, 400-ft capacity; 16mm Photo-Sonics; 16mm Wollensak Fastair, 100-ft capacity; 35mm Photo-Sonics 4B, 500-ft capacity; and Wollensak Fastax WF-17 combination picture and oscilloscope trace recorder.

As altitudes and ranges of guided missiles increased, there was further interest in full-frame ( $2\frac{1}{4}$  by  $2\frac{1}{4}$  in.) 70mm motion-picture cameras for use on new missile tracking mounts, such as the Perkin-Elmer ROTI. At year's end, there were three such cameras capable of operation at 60 frames/sec or more, including those manufactured by Flight Research, Mitchell, and Photo-Sonics. Such cameras may also be useful at high-speed rocket sled tracks, to replace some of the CZR-1 Bowen Ribbon-Frame Cameras now used with  $5\frac{1}{4}$ -in. aerial roll film, as described by Lassiter and Krupp<sup>208</sup> and by Egbert and Ankeney.<sup>209</sup> A related development is the new Cine-Grafic Engineers' "Datastrike" camera which records the same width image (approx.  $2\frac{1}{4}$  in.) on 35mm film at rates up to 60 frames/sec, using an approach similar to the VistaVision concept.

A shoulder-mounted tracking camera developed by the Naval Ordnance Laboratory to photograph mines dropped by low-flying, high-speed aircraft was described by Erickson and Grover.<sup>210</sup> Fairchild Flight Analyzer was developed to record successive exposures of aircraft glide patterns on a single 8 by 10-in. photographic plate.<sup>211</sup> Automatic exposure control systems applied either to variable shutters or to iris diaphragms of lenses were described by MacIntosh.<sup>212</sup>

Bell & Howell Professional Equipment and Instrument Div. produced firing error indicator pods for missile evaluation programs. The pods contain four intermittent-motion, 200-frames/sec, 16-mm cameras with extreme wide-angle lenses of  $142^\circ$  conical coverage. Cameras are oriented to photograph a complete spherical coverage about each pod. As generally used, the pods are mounted on each wingtip of a drone target aircraft

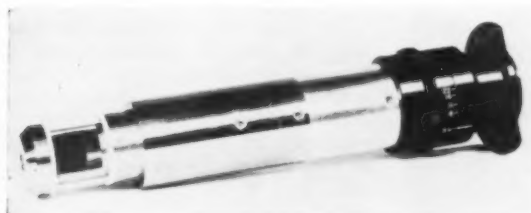


Fig. 38. Zoomar Supersonic Lens.

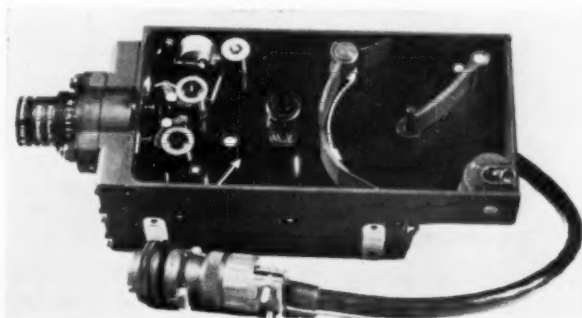


Fig. 39. 100-ft magazine for Bell & Howell N-9.



and missile trajectories are reconstructed by triangulating the photographic read-out angles. The camera and jettison sequences are remotely operated by ground control transmitters. If jettisoning is required to insure safety of film records, a self-contained parachute lowers the unit to the sea where it floats until recovered.<sup>213</sup>

The scope of this report does not permit an exhaustive listing of new products that have appeared during the reporting period, but the above examples indicate that the photographic instrumentation industry is beginning to come forth with some of the new and unusual "hardware" which Mr. Betty says our missile programs must have. This trend was running strong at the end of 1957, and should be further accelerated during early 1958. The critical nature of our missile development and test program requires that all members of the SMPTE lend their specialized talents toward solution of the many optical instrumentation problems that still lie ahead. The Society's Engineering Committee on High-Speed Photography will undertake the initiative in soliciting such assistance from the Society during the current year.

In the field of high-speed electronic flash work, Griffin<sup>214</sup> described his modification of a flash source to increase its uniform exposure time from 0.60 msec to approximately 2.50 msec. This equipment was utilized to photograph penetration of aluminum plates by projectiles, the auxiliary light source effectively suppressing plate "flash" that had previously obscured the projectile's image. In another development at the U.S. Naval Ordnance Test Station, Sewell and others<sup>215</sup> developed an explosive argon flash system permitting multiple exposures at greater levels of illumination than had been possible with the well-known Cranz-Schardin multiple spark system, which it replaces in this application. Colson and Edgerton<sup>216</sup> outlined their development of a compact and rugged xenon flashtube for use in airborne data recording, while another use of a xenon flashtube—as the light source in a sensitometer—was described by Wyckoff and Edgerton.<sup>217</sup>

A well-designed portable power supply for operation of high-speed motion-picture cameras in temporary locations was reported by Peterson and Currie.<sup>218</sup>

Work noted in the field of schlieren systems for photography of gas flow included that by Hays,<sup>219</sup> who outlined a simplified method for obtaining color images; a method for obtaining two simultaneous views of a gas flow by Rudinger and Somers;<sup>220</sup> and a description of methods used to obtain magnification changes in schlieren systems by Blount and Jordan.<sup>221</sup>

The British Admiralty announced activation of a large annular tank for research in hydrodynamics.<sup>222</sup> The more

than one million gallons of water in the chamber are specially treated and filtered to insure utmost clarity for underwater high-speed photography. Another article<sup>223</sup> describes the rotating-disk camera and optical whip recorder that have been of great value in hydroballistics research at the U.S. Naval Ordnance Test Station's Pasadena Annex.

Other applications noted in high-speed motion-picture photography included studies of rock-breaking operations,<sup>224</sup> and a mechanical igniter for liquid rocket engines.<sup>225</sup> Fuel droplet dispersion in a rocket engine chamber was studied by use of a novel single-sweep mirror camera.<sup>226</sup>

The field of data assessment included a paper by Larsen<sup>227</sup> giving methods used at SMART Track in Hurricane, Utah, and a description by Hyzer<sup>228</sup> of factors contributing to accuracy of 16mm film evaluation while utilizing a Vanguard Motion Analyzer film measuring device.

The *Journal* carried an illustrated report by Painter<sup>229</sup> on the Third International Congress on High-Speed Photography, and the Proceedings of that Congress were reviewed in the *Journal*.<sup>230</sup> A committee was appointed by the Chairman of the High-Speed Committee to initiate planning for the Fifth Congress, which will be held in the United States during 1960. Meanwhile, many workers in this field are making plans to attend the Fourth Congress, to be held in Cologne, Germany, during the period of September 22-27, 1958. It appears certain that the increased importance of high-speed photography and photographic instrumentation felt during the last few months of 1957 will be reflected in that meeting.

The Session on Missile Photography held May 2, 1957, at the Society's Convention at Washington, D.C., was of particular importance in view of the immediate interest in this branch of the art. Papers presented at this session were later grouped for publication in the *Journal*.<sup>231</sup>

#### Armed Forces

The Naval Research Laboratory has developed a transparent cathode-ray screen which enables the viewer to see the video image and also objects behind it. Owing to the lack of lateral scattering from the grains of the phosphorescent material, the image definition and resolution are better than with conventional screens. It has proven effective for daylight viewing since incident light passes through the transparent screen without being reflected. Incident light on a conventional screen is reflected back and tends to wash out the video image. A flat plate cathode-ray tube is being developed for the Office of Naval Research by the Kaiser Aircraft and Electronics Corp. In this tube the video information is delivered to the flat plate screen from

its edge, or parallel to its face. The combination of these two developments is expected to provide a flat plate, transparent cathode-ray tube which will have many military applications. Installed in aircraft windshields it will provide the pilot with visual and electronic information at the same time. The possible applications of these developments to TV receivers are obvious.<sup>232</sup>

In the first large-scale attempt by the military to utilize closed-circuit television to provide necessary timely information for a Field Army Staff, the Signal Corps effectively used this medium during "Operation King Cole" at Fort Polk.<sup>233</sup>

The first permanent installation of compatible color television equipment for the purpose of medical education has been made at the Walter Reed Army Medical Center, Washington, D.C. This is probably the largest closed-circuit color TV system in the world, and it provides television originations from microscopy, surgery, and autopsy, as well as from demonstrations and lectures. At the 81st Convention of the Society approximately 230 members visited the Television Division of the Walter Reed Army Medical Center and witnessed an impressive demonstration of this system by means of projected television images on 5 by 7-ft screens.<sup>234</sup>

The United States has developed and is currently using a compact shipboard rapid processing machine. The machine, Type EH-9, built by Morse Instrument Co., features compact size, which is 46 in. long, 24 in. wide, and 60 in. high. It has modular tank design, submerged jet agitation, air impingement drying, daylight operation, and ability to run 16mm or 35mm films interchangeably at rates up to 50 ft/min. The machine is used for rapidly processing, in a minimum of elapsed time, 16mm gun-camera film, 35mm radar recordings, and motion-picture films (Fig. 40).<sup>235</sup>

**Standardization:** The 82d Congress enacted Public Law 426 known as "The Defense Cataloging and Standardization Act" which enjoins the Armed Forces to standardize to the maximum extent practicable. Public Law 1028 of the 84th Congress reaffirmed the intent of the previous act. These Congressional instructions have resulted in the formation of committees of the various interested branches of the Military Services under the direction of the Department of Defense. Some examples of photographic equipment standardization are as follows:

(1) Approximately 30 relatively minor changes resulting in some major improvements in the JAN 16mm projector are expected to result in a projector acceptable to all of the services without deviation in procurement requirements.

(2) Portable screen sizes are under study to reduce the number bought and

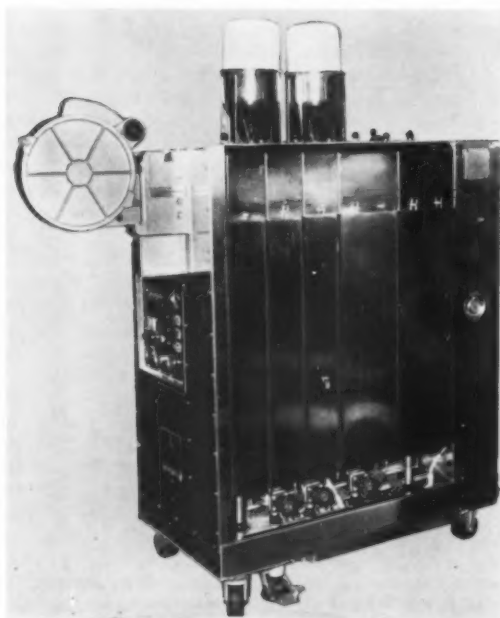


Fig. 40. Navy Type EH-9 rapid processing machine, Morse Instrument Co.

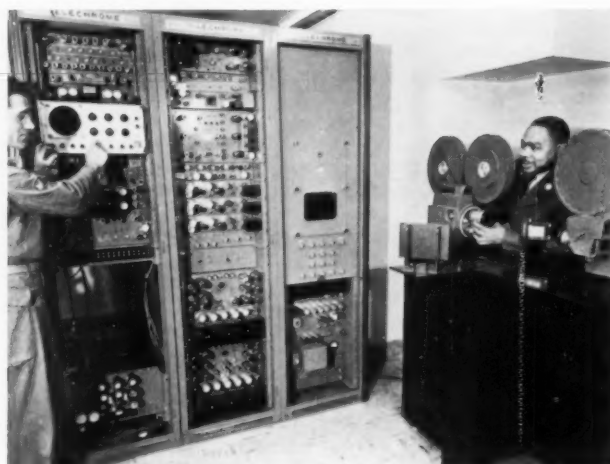


Fig. 41. Walter Reed Hospital Color Kinescope Film Recorder.

stocked by the Armed Services. Specifications are being written to make them completely realistic.

(3) The operative dimensions of overhead projectors have been made standard by all Federal agencies and new specifications are being prepared.

(4) Specifications for slide- and strip-film projectors are being expanded to include automatic types. They will result in standard requirements by the Armed Services if not by the entire Federal government.<sup>226</sup>

#### Medical

A new method of "scrambling" and decoding televised pictures has many possibilities for medical teaching. It has been developed at the University of Kansas Medical Center.<sup>227</sup>

Closed-circuit television has become an integral part of hospital operating equipment. In addition to assisting directly in several surgical operations, it has given the medical profession new approaches to classroom instruction, and has boosted patient morale to an all-time high.<sup>228</sup>

The Walter Reed Hospital color installation in Washington, D.C. (Fig. 41), continues to expand the scope of its activities, and has added color-kinephoto equipment for production of training and record films.<sup>229</sup>

A specialized color system was developed and announced for ultraviolet microscopy by the Rockefeller Institute for Medical Research. This appears to offer a valuable tool for medical cell and tissue research.<sup>240</sup>

An RCA ultraviolet-sensitive TV camera tube is making possible a large step forward in cancer research. This developmental tube is used in an unusual application of closed-circuit TV that in-

volves employing of a high-power microscope and an electronic oscilloscope to obtain direct observations and oscillographic measurements of the metabolism of living cells. This new research technique is now being used on an experimental basis at the National Institutes of Health, Bethesda, Md.<sup>241</sup>

An automatic standardizing multi-camera assembly for medical photography has been described.<sup>242</sup> The assembly described was constructed for the production of accurately controlled and repeatable still and motion pictures in long-time medical research photography.

The use of cine extension tubes for cinematography of small objects by the

medical photographer, Mervin W. LaRue, has been described.<sup>243</sup>

#### PROGRESS IN OTHER COUNTRIES

##### Africa

The report from South Africa contains very little of a technical nature, however much politically seemed to be happening. Interests from the U.S. are reported to have acquired 99% of the exhibition houses in South Africa, making production companies almost a closed shop, unless such productions are made for export for television purposes or in 16mm for showing from town to villages. The government is encouraging

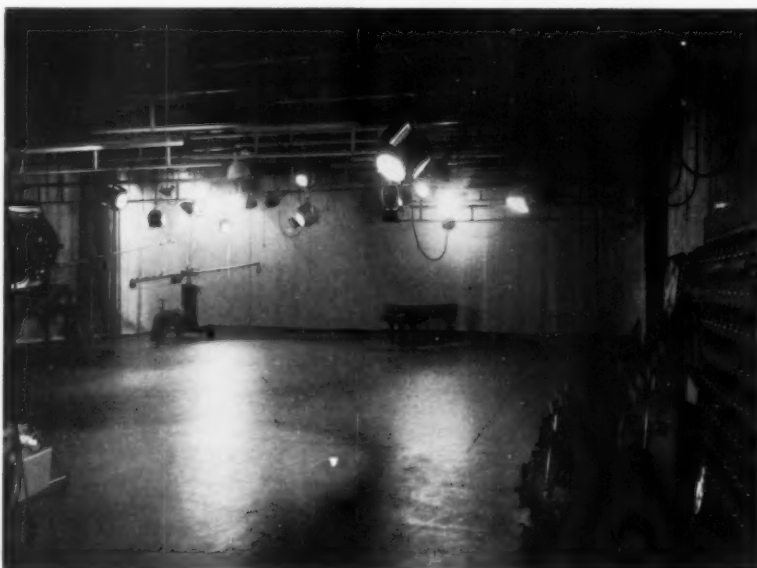


Fig. 42. Interior of one of Artransa's soundstages.

35mm production and the entertainment tax will be rebated on those films.

Several companies are setting up to process Ferrania Color and Eastman Color film. The government runs several film-producing units.

NRS Film Laboratories offer amateur service and 16mm Kodachrome duplication for the TV producers in Africa. These films are all exported. Film Production Facilities of Irene are laboratories handling 16mm and 35mm black-and-white and color and catering to any producer in the country. They also make packaged home movies under license to the National Parks Board. Cine Labs of Johannesburg is an independent laboratory, processing mainly amateur reversal films but now expanding into professional color laboratory services.

Studios NRS and Film Production Facilities both have studio facilities which are hired out to any interested client. Apart from this, most producers make outdoor animal films and since the interest in TV series overseas, there are several producers in this country producing such films mainly in 16mm.

Cine Union (Pty) Ltd. of Johannesburg produces mainly films for the mines and educational-type films for various institutes such as traffic departments, universities, etc.<sup>244</sup>

#### Australia

##### Motion Pictures

Overall, the motion-picture industry in Australia has altered very little in the last two years. More drive-ins and general lowering of theater attendance are the chief changes. The total of 35mm theaters now operating is 1,774, with 43 drive-ins and more contemplated.<sup>245</sup> One hundred and seven fixed locations are showing 16mm sound films. Both TV and drive-ins are contributing to the lowering of general theater attendance.

There has been a marked increase in production facilities, mostly brought

about by the advent of TV. Melbourne has a new, centrally located studio and production unit opened by Cambridge Productions. Artransa in North Sydney have constructed new studios and complete facilities on 25 acres of ground at an expenditure of half a million pounds (Fig. 42). Pagewood was used last year by Cinerama (Dudley Pictures) and also for feature production by an English company. It has been found that overseas companies can form a local company, use a high percentage of local talent, and produce features at a very reduced figure over their home operation. Three other large studios are also operating, as well as many small units.

There are fewer film laboratories now in operation, both 16mm and 35mm. This still leaves adequate facilities for handling all requirements of the Australian market. One laboratory is now equipped to process Eastman Color Films, both 16mm and 35mm. Most of the TV stations have laboratory facilities on their own premises as do a number of the Commonwealth and State Government Departments.

Cinevox (Fig. 43) and Victor 16mm sound projectors are still being wholly manufactured in Australia. This covers the school and Government department requirements. Several locally manufactured tape recorders for domestic use and two professional makes are now on the market.

Many travel and instructional films made in Australia are now being exported to U.S.A.

##### Television

Television services were inaugurated in Australia near the end of 1956 with the establishment of three stations each in Sydney and Melbourne (Figs. 44, 45).

The European CCIR 50-field 625-line system was adopted with provision for ten 7-mc channels in the low VHF and high VHF band to be allocated in accordance with a provisional plan.<sup>246</sup>

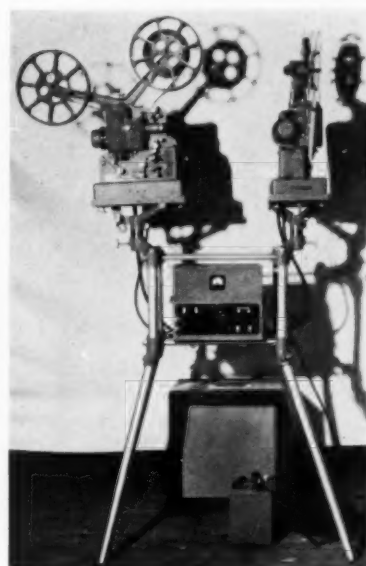


Fig. 43. Cinevox Dual 16mm Sound Projector.

This will provide four channels for each state capital city and two channels in each center of 5,000 or more population. For further expansion, space has been reserved in the UHF band.

The Australian TV system has both Government stations, operated by the Australian Broadcasting Commission and supported by an annual receiver license fee of 5 pounds, and commercial stations which closely follow the American pattern and are dependent entirely on advertising revenue for their operation. Initial hours of operation ranged from 32 to 44 per week for each station and have expanded to a maximum of 52 hours per week, of which up to 66% is live production.

Transmitters are grouped geographically in each city and employ 100-kw e.r.p. (effective radiated power) on all channels. In some instances a single



Fig. 44. Master control room operations desk at ATN TV Centre, Sydney.

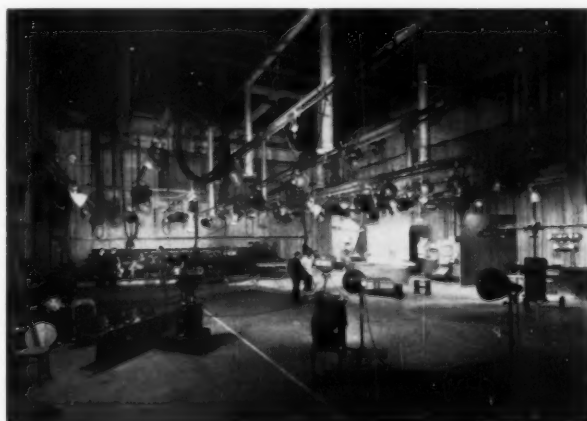


Fig. 45. Interior of Studio A at ATN TV Centre, Sydney. Largest studio in Australia, it measures 70 by 90 ft.



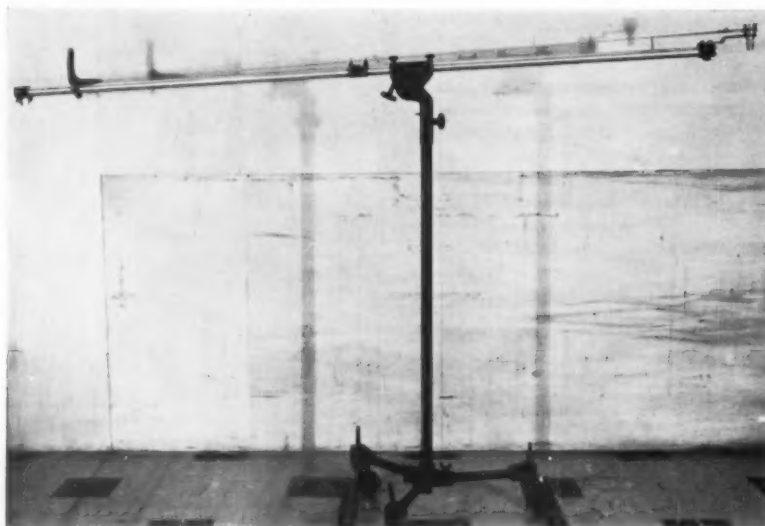


Fig. 46. National Film Board lightweight boom.

site has been used for studios and transmitter, but in the majority of cases separate studio sites have been used. In most cases good provision has been made for expansion of studio facilities with one studio having a site area of 24 acres.

As there are as yet no coaxial or microwave transmission facilities between Sydney and Melbourne, kinescope recording is used for the distribution of locally produced live program material. Most equipment used for kinerecording employs the suppressed-field method but a fast pulldown 16mm camera<sup>247</sup> has been used for many of the recordings produced. The camera accomplishes the pulldown in the vertical blanking interval and enables both fields of the picture frame to be recorded.

Studio and transmitter equipment follows conventional European and American practice with equipment being drawn from all sources. Image-orthicon studio cameras are used, and some use has been made of the 4½-in. image orthicon which better utilizes the 5-mc video bandwidth of the Australian system than does the normal 3-in. tube.

A total of 220,900 TV receivers was produced by 19 manufacturers in Australia up to October 31, 1957. In addition, 8,300 sets were imported. Early production was mainly 17-in. with a few 21-in. and 24-in. picture tubes. The present trend is toward the larger sizes; October 1957 production was 26,667 chiefly of 14,718 21-in. and 8,949 17-in. Although some components and subassemblies were imported in the initial stages the total amount of imported items has been reduced considerably during the year. Most parts that go into the TV set including turret tuners, deflection components and even the Ferroxcube used in IF coils are now produced locally. Picture tubes are produced

by five manufacturers using imported glass. The U.S.A. influence is noticeable in the development and styling of TV receivers, particularly so in the circuitry used by the various manufacturers. Three IF stages are now almost universally adopted by all manufacturers for their standard receivers. Also, the trend has been more toward the transformer type of receiver rather than the a-c/d-c type.

Portable receivers have not yet been manufactured in very great quantities in Australia, but it is now already evident that Australia will not follow the United States trend by bringing in small screen sizes. It is most likely that portables will have a minimum screen size of 14 in. and the majority will be 17 in., with performances equal to that of standard sets.

Considerable attention has been given to the effect on picture quality of the group delay characteristics of transmitters and receivers<sup>248</sup> and a new IF amplifier design<sup>249</sup> features a linear phase characteristic at low video frequencies.

The Australian Broadcasting Control Board has added a phase characteristic to its standards covering television transmitters.<sup>250</sup> The new standard is based on the use of a receiver having a phase-linear characteristic at low video frequencies, with correction incorporated in the transmitter for its own phase distortion resulting from the use of a vestigial sideband system and also for phase distortion near the upper video frequency cutoff in both the transmitter and a receiver of specified characteristic.

#### Canada

Perhaps the most significant event in the motion-picture and television field in Canada in year 1957 occurred in New York City in January, when the Board of Governors of the SMPTE authorized a

Canadian Section for the 180 members living in Canada. It is felt that having local sectional meetings alternately in Toronto and Montreal will greatly increase the participation of the members in the Society and assist in its growth in Canada. Four meetings were held during the year and reported in the *Journal*.

At one of the early meetings in Montreal a subcommittee of the Society's Laboratory Practice Committee was formed to investigate possible standards for Canadian motion pictures and television. The terms of reference of this committee are:

(1) be limited to monochrome film for the present;

(2) undertake to supply the means for the calibration and standardization of sensitometers and densitometers in participating laboratories with National Film Board acting as the working agency for the committee in conjunction with the National Research Council;

(3) study and prepare recommended practices for the processing of camera film stock to insure uniform speed rating conditions in participating laboratories;

(4) study and prepare recommendations for the standardization of agreement of printer exposure results;

(5) determine requirements of film images, sound and picture, for TV exhibition and prepare recommended practices for meeting these requirements;

(6) prepare a recommended practice for film review rooms.

In 1956 the Canadian Film Industries Co., Ltd., Toronto, completed a 35mm Eastman Color Film processing and printing plant and a dual dubbing theater with 12-channel mixing console.

At the National Film Board, a lightweight portable microphone boom was designed and constructed (Fig. 46). It is equipped for remote microphone focusing and has a variable counterweight balance. The boom has a maximum extension of 12 ft and a retractable area of 8 ft for smaller locations. The boom may be extended vertically to 10 ft and is dolly-mounted for possible zooming on the set, with ease of shifting. It can also serve as a fishpole where the boom may be inadequate during complicated shooting. The boom completely disassembled for shipping can be housed in a small container 5 ft in length, and 6 in. in depth and breadth. The total weight of boom and container is 55 lb.

The Christie Chemical Co. of Montreal has inaugurated a photographic analytical laboratory for routine and specialized control testing of chemicals and solutions. This service is available to the Canadian motion-picture industry as a whole.

Operations on the Trans-Canada microwave system to speed TV and long distance telephone communications progressed during the year.<sup>251</sup>



## Chinese Peoples Republic

The film industry of China is practically State owned, and completely under the control of the State Ministry of Culture, which operates under what is known as the Film Bureau of China. It is comprised of these units or branches:

- (1) Production;
- (2) Film Laboratories and Processing;
- (3) Exhibition;
- (4) Film Equipment, and Manufacturing thereof;
- (5) Distribution;
- (6) Publicity; and
- (7) Film Academy.

### Production

The entire production setup was gradually taken over by the State after 1952. An authoritative source has stated that this nationalization was on the initiative of the various private producers who had encountered economic difficulties in running their organizations.

Shanghai was then, as it is now, the chief center of film production and here all the studios were amalgamated into one unit under the name of the Shanghai Film Studios. Eight stages are available for production, chiefly features. One of these is completely air-conditioned. There is also a fairly well equipped center for the production of animated cartoons; under another roof is a center for the production of puppet films. Both types of films are made entirely on monopack Agfa Color.

The second center of film production is at Chang-chun, in the North, which makes fewer feature films than the Shanghai studios; but a considerable amount of dubbing work of films from different countries including the Soviet Union, Italy and India, is being done. These films help in supplementing the meagre output of the Chinese studios.

The third center of film production is at Peking where, though feature films are not entirely ignored, the concentration is on documentaries and newsreels.

The films produced may broadly be divided into six different categories:

(1) *Features*: The length of a Chinese feature film in contrast to others is only about 7000 to 8000 ft. The total annual production of these is about 25.

(2) *Cartoons and Puppet*: These are 1000 to 2000 ft long and deal mostly with progressive subjects, and invariably have a basic ennobling theme.

(3) *Scientific and Educational*: The length varies with the subject in hand. Usually they find no place in the regular theater program.

(4) *Documentaries*: These are meant for regular theater release and deal with both the material and cultural development of the country. The length varies from 1000 to 2000 ft.

(5) *Newsreels*: One newsreel is produced and released regularly every five

days in contrast to weekly issues in other countries. In addition, special issues of important events are released within two or even one day of the news event.

(6) *Training Films for the Defense Forces*: These are produced in a separate studio which has little or no connection with regular production.

We would also like to point out here that so great is the emphasis on realism in production that it has become a regular routine, not only for the script writer to pay a visit and stay on location for a detailed study before attempting to write a single line, but the main players and the director invariably stay and acquaint themselves with the life of the class of people they are to portray in the film. These periods of study often extend from one month to three months. Only then are they permitted to return to the studio for actual shootings.

### Taking and Processing Equipment

The technical equipment of the three studios is mostly imported, largely from the USSR, but quite an amount also from the United Kingdom, Germany, France, Italy and even some from the United States. Except for an extremely efficient German background projector, the rest of the equipment, except that of Soviet origin, was rather outdated. The British Newalls are very popular, but their numbers are few. We observed many of the older models of the French Cinephones and the Eclairs, and the German Askanias. Andre Debrise's "L" 400-ft models were invariably used in the animation stands, which were found in all three studios. These stands had all been manufactured locally, and are of extremely good workmanship.

The recording equipment was mostly of USSR origin, built more or less on earlier American design, but nearly all the re-recording stages were equipped with the excellent British acoustics sets.

Invariably six-channel mixers are used with extremely up-to-date mixing consoles. Synchronous magnetic recording does not appear to be very popular, although there is a locally built unit at the Shanghai studios.

The laboratory equipment, except for a solitary compact little machine from the USSR, at the Peking studios, is entirely of local manufacture. These invariably lacked the many modern refinements which improved processing technique has made so necessary today. Also, there were two Japanese machines left over from the days of the occupation.

Although the entire laboratory equipment is comparatively primitive, extreme care is taken that the work is carried out as scientifically and methodically as possible. Toward this end the air in the drying cabinet is invariably dehumidified to the temperature and humidity required, and then circulated.

Complete periodic chemical and other checks are maintained on the solutions, and within the limitations of the equipment, strict sensitometric control is adhered to. Such instruments as sensitometers, densitometers or pH meters are not allowed to lie in some corner mildewed for want of use. It is this care which is responsible for the maintenance of a certain level in the work.

The printing equipment is chiefly the well-known Bell & Howell Model D printers, while release work not requiring any light changes is done on simple USSR-built continuous printers. However, one such printer has been adapted for light and color control. Optical printers are not much in evidence, although there is one at Shanghai built locally with imported parts.

Contrary to expectations, Soviet or other foreign experts are conspicuous by their absence; a solitary color adviser was noted on one of the stages where a film on Agfacolor was being shot.

In the field of color processing, there is an indigenous machine, possibly built for experimental purposes, but to visitors, at any rate, it appeared improbable that any serious work on it was possible. It was claimed, however, that the entire negatives of their color feature *The Two Butterflies* was done on it. If this is so, it is yet another instance of careful and painstaking work succeeding where slipshod methods with the best of equipment may fail. In any case, credit should be given to the Chinese technicians who, unaided, pioneered the processing of color films in their country.

### Exhibition

There are in China about 900 permanent theaters of which about 150 are still either completely privately owned or owned jointly by Government and private enterprise. Besides these there are 3,500 state-owned mobile 16mm projection teams touring the rural areas. We are told these teams are extremely popular. Statistics reveal that last year there had been an audience of over 920 million at these traveling shows. The price of admission in theaters is extremely low; there is no entertainment tax.

### Film Equipment

At present there is only one factory, at Nanking, manufacturing 16mm projectors of a well-known USSR design. This factory is unique insofar as it is a completely self-contained unit, even to the extent of manufacturing its own lenses and its electrical accessories. As a side line, the factory manufactures occasionally processing machines and replacement parts for existing 35mm projectors, as well as parts for cameras. Here also, the absence of any foreign technicians or experts was notable.



Fig. 47. On the set of a color production on the life of the celebrated actor Mei-lan-Fang.



Fig. 48. Interior set for a black-and-white production.

#### *Distribution*

All internal distribution of films in China as well as all export and import from friendly countries is controlled by the China Film Distribution Corp., a State-owned concern.

#### *Film Academy*

Fully conscious of the need for a source of supply of the necessary personnel to man the different branches of the various organizations under the Film Bureau of China, the Chinese Government, simultaneously with their acquisition of the Industry in 1952, set up a pilot institution where not only artists and technicians but also men and women required in such other branches as distribution, exhibition and publicity could be trained.

#### *Impressions*

The general impression of the film set-up in China, received by a visitor even slightly acquainted with the Indian film industry like this reporter, is one of an extremely orderly and planned progress. First in the program of the development of the industry in China, naturally came the establishment of a

Film Institute for the training of administrators, directors, technicians, artists and craftsmen of all description. In India, the industry as such has been in existence for the last forty years; still it was left to the State to think of the establishment of a Film Institute.

Now 16mm projectors, as we all know, have a high depreciation figure. Taking this figure at a modest 12½%, the yearly requirements for replacing the traveling projectors is about 800. This figure does not include the large number of projectors employed in the schools and colleges, and other nontheatrical circuits and the defense services. To meet this demand the self-contained factory noted above is geared to making over 1,200 projectors a year. This factory is expected to be the starting point for other factories that will manufacture other specialized equipment such as cameras, printing machines, recording equipment, processing machines and, of course, 35mm projectors. Even now a beginning has been made on processing machines and the spare parts of existing 35mm projectors.<sup>252</sup> (Figs. 47, 48).

#### *Egypt*

There has been a motion-picture industry in Egypt for nearly twenty years. The first studio established was Misr Studios of the Society Misr of Cine and Theatre. It is in Giza, about fifty miles northwest of Cairo. It is the largest studio in the Middle East. It consists of three sound stages well equipped with the latest models of lights, booms, cranes, cameras, dollies, sound equipment, either magnetic or film for both indoor and outdoor, and other equipment necessary for producing films in either black-and-white or color in normal size or in CinemaScope. Nearly all the equipment is American and European made. The original sound is done on magnetic tape and transferred to film for cutting and printing releases.

Besides the studios, there are two laboratories. One is equipped with German processing machines, the second with the latest Debie processing machines "Multiplex." These machines are button-drive, complete with automatic temperature control and automatic replenishing. Both laboratories are for



Fig. 49. View of laboratory in Misr Studio.



Fig. 50. Set in preparation at Misr Studio.

processing the original negatives and daily rush prints besides the release prints. The printing machines are the latest French Debie printing machines "Matipo." There is also a laboratory for 16mm equipped with Debie machines for processing both 32mm and 16mm films and printing machines, one for reducing from 35mm to 16mm and the other for 16mm. The electrical power for the machines of the different sections of the studios is independently switched and supplied from a special electrical power station set up for the studios.

Besides Misr Studios, there are The Pyramids Studios Co., Nahas Film Co., Nassibian Co. and Merry Quinny and Galal Studios, all in Cairo. They are well equipped with American and European equipment besides home-made equipment. Each of them has its own laboratory for processing its own productions.

The film industry in Egypt produces about 60 feature films a year with distribution range from Turkey to Abyssinia and North Africa. All the releases are in the Arabic language. Three years ago all studios stopped operation except for the Society Misr. The supreme difficulty most studios face is in the acquisition of proper supply of negative and positive raw stock, and faulty technical work. Definite progress was made this year owing to better economic conditions, and nearly all the studios worked and made some increases in producing films. During this year, there are feature pictures scheduled for release in Cinema-Scope and in color, in addition to a considerable number of short subjects.

Theaters in Egypt number about 250, about 75 of them in Cairo, 30 in Alexandria and the rest in the other parts of Egypt, where drive-ins are unknown. (Figs. 49, 50).

*Television:* A new station is expected to be started shortly.<sup>253</sup>

#### Far East

1957 was a year of technological development in the Far East, marked by the beginning of a transition. The motion-picture industry felt the serious challenge by television. Construction was begun on the world's tallest man-made structure outside the USA—the 330-meter (1,083-ft) Nippon TV City radiation structure. The six major Japanese motion-picture producers tried to incorporate two future major TV outlets in Tokyo.

Economic status of most Asian nations registered further upward gains during 1957, a sure harbinger of positive improvement for these entertainment and educational industries. Japanese theater boxoffice grosses registered monthly increases to new highs despite some reduction in domestic production releases from the prior year's record total. Progress in other countries of the Orient

was positive, if perhaps less spectacular. Asian producers and exhibitors adopted anamorphic and VistaVision techniques employing increasing numbers of domestically-produced cameras, lenses and exhibition equipment of modern design. Japanese film productions in color trebled in numbers.

1957 — the traditional "Year of the Rooster" in the 11-year zodiac cycle cherished by most Asian nations — witnessed much to crow about.

There was limited adoption of wide-screen techniques and modest increases percentage-wise in color production releases, but no significant technical developments in the motion-picture industry. This does not imply unprogressive attitudes on the part of producers in the Philippines, Nationalist China (Formosa), Hongkong, or Singapore, but rather indicates that technical progress is dependent upon production components imported from America, Great Britain, France or Japan. In this respect, the majority of the Asian producers and exhibitors tend to lean strongly upon technical advisory and supply services of international manufacturers and distributors such as Westrex Co., whose sound-recording channels are virtually everywhere in Asia, not excepting Japan.

One pioneer service was the closed-circuit TV network inaugurated last July by Associated-Rediffusion, Ltd. (London) for the British Crown Colony of Hongkong and Kowloon. Dictated in its choice by political necessity of an agreement which prohibits British sources from radiating signals outside the limits of the Colony boundaries, the venture is not "cable theater" in strictest sense since programming is regular TV broadcast fare with bilingual sound. Commercial advertising revenue plus subscribers' fees support the enterprise which began with a reported 840 customers and by year's end, over 1200. Subscribers are supplied with specially-designed TV receivers for the cable-fed input signals in addition to terminal coupling equipment. Involved in initial distribution requirements are said to have been more than three million feet of coaxial cable plus nearly 200 signal boosting amplifiers located both around Victoria Island (Hongkong) and the mainland area of Kowloon which comprise the Colony. These separated segments further necessitated over a mile's length of underwater cable supplemented and protected by an emergency microwave channel which doubles for relaying remote program pickups. In addition to local live programs, the daily service programs American, English and Chinese feature movies, supplemented by special event filmed TV programs in both Chinese and English languages disseminated both through subtitling and dubbing means. This venture seems to

have been the world's first subscriber wire-linked TV service and is reported to be successful, both technically and financially.

Television in other countries of Asia gained only a tenuous foothold. A beginning was made in Manila with one commercial station, supplemented for Filipinos within receiving range, by the Armed Forces TV station of relatively low power, located on Clark Air Base, Pampanga Province, some 45 miles northeast. In Seoul, capital of the Republic of Korea, 500-w HLKZ-TV, which inaugurated semicommercial telecasting in 1956 as an American-capitalized venture by the RCA products distributor, was reorganized during 1957 into a cooperative venture with local entrepreneurs and nearly all programming with Korean subjects and language. Armed Forces Korea Network installed facilities in Seoul, with slave repeat transmitters located to northeast and northwest to serve American troops.

An interesting initial cooperative venture occurred on Christmas 1957 when a star-studded group headed by comedian Bob Hope went to Seoul to bring some Hollywood live entertainment to American Forces stationed in Korea. HLKZ-TV, being better equipped for remote TV pickups, handled the full program from the selected Seoul theater stage where the show originated, and transmitted locally, as well as fed the pickup to the mountain-top located AFKN-TV for relay through repeat transmitters to tactical troops stationed northeast and northwest along the demilitarized zone as far as 40 miles distant.

One major roadblock to growth of commercial television in the Republic of Korea is a reported exorbitant tax (185%) on imported TV receivers, levied by the government despite there being no present or apparent prospective local manufacturing industry.<sup>254</sup>

Full reports on China and Japan are in separate sections.

#### France

A \$7 million international Cinema City is in process of construction at Vallauris, three miles from Cannes and the Mediterranean. It will cover 57 acres, require three years to build, and is expected to be used by producers of many countries other than France.<sup>255</sup>

#### Normavision

Anamorphosing at the ratio of 1.5 was, in several instances, applied to the cinema. It has thus far been reported used in the system with mirrors called Delrama, in Technirama process, proposed in VistaVision, and has been applied to 16mm lenses.

Recently the Normavision process was adopted to anamorphose 1.5 for the



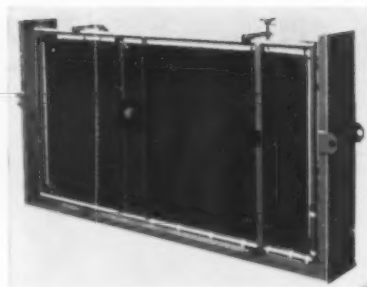


Fig. 51. Variable reverberation device (open) with handwheel for reverberation-time change.

image; hence the negatives obtained are in agreement with standards for 35-mm prints with photographic sound-track. On the screen the image appears in 1.85 by 1 size; the definition is excellent and the absence of aberration allows projection on a very wide screen. The images shown on an 8-meter high screen have been considered very good.

#### *Spatial-phonics*

Simultaneously with the Normavision, which bears a photographic sound-track, the sound reproduction has been improved by two supplementary magnetic tracks coated on the edge of the film, able to reproduce the sound from the screen and the spatial sound in the theaters. Very interesting effects proved far better than those obtained in other systems previously proposed. The quality of the sound perceived in the theater has been further improved by adopting on three tracks, with the technique specified as "spatio-phonics effect"; with groups of loudspeakers placed in the ceiling, the sound reproduction reaches a realism never before obtained and fully justifying for the first time the word "stereophonic."<sup>226</sup>

#### **Germany (West German Republic)**

The cold light mirror now available in Germany is a good solution of the old problem of heat dissipation in film projectors. It works on the principle of reflecting only the visible parts of the light current produced by the lamps used for projection purposes, whereas the remaining components of this energy, consisting of the longer-wave heat rays, are allowed to pass through the mirror and are led out of the lamphouse by the ventilating system. The mirrors supplied to Germany are made by Geraetebau-Anstalt Balzers and were recently described in the *Journal*.<sup>227</sup>

An Acoustical Time Regulator has been designed to increase or decrease the speed of a recorded piece of music or a speaker during playback within certain limits, without the occurrence of the slightest change in pitch or volume. It is possible to fix definitively any de-

sired value and to change the speed at will during playback. The playback of a recording is lengthened, i.e., the speed is reduced, by picking up repeatedly some individual sections of the modulation of the sound carrier. In the inverse case, the time of playback is shortened — the speed is increased — by omitting or skipping individual sections of the modulation. Demonstrations are planned soon in U.S.A. and an extensive New Products column is expected soon for the *Journal*. The manufacturer is Telefonbau & Normalzeit GmbH, Frankfurt/Main.

A variable reverberation device (Fig. 51) is suitable for radio, television, film and any other recording studios as a superior replacement of conventional echo-rooms. It produces true impressions of large halls, churches, cellars, etc., and is very useful for instance when recording jazz or entertainment music as it enables controllable separate reverberation treatment of soloists, choirs, or solo instruments. The principle of operation is: A flexible undamped steel plate is freely suspended in a frame. A surface drive element of moving-coil type causes virtually undamped mechanical vibrations of the plate. Two-dimensional waves are induced in the steel plate at reduced velocity due to the large area, material and cross section of the plate. Damping of vibrations of this plate limiting the echo time is controlled by a rigid associated plate of porous material.

The manufacturer, Elektromesstechnik Wilhelm Franz K.G., Lahr, Schwarzwald, gives the following data for the reverberation set EMT 140: input level, 1.55 v (program line); output level, 1.55 v (program line), range approx. 30–12,000 c; reverberation time, between circa 1.2 and 6 sec; size, 2.50 by 1.30 by 0.60 m (8'2.4" by 4'3.18" by 1'11.6").

#### *16mm Equipment*

Double-System Projector 16/16 has been designed to be driven by a synchronous motor and has a 750-w lamp. An interchangeable gear for 24 or 25 frames/sec can be provided. The projector is designed for stationary application in a studio and can be equipped for a variety of sound recordings, reproductions and other operations necessary in film production. The standard amplifier cabinet which serves as a projector pedestal can accommodate the necessary amplifiers, instruments and switching devices to be used for several purposes: (a) *Reproduction*: for a single-system performance of 16mm picture film with optical or magnetic sound edge track or for synchronous double-system performance of 16mm picture film and separate 16mm magnetic sound film with center track; (b) *Recording*: for picture synchronized sound recording

upon the magnetic sound edge track of a 16mm picture film or upon the center track of a separate 16mm magnetic sound film, as well as for re-recording from center track upon edge track or vice versa, or from optical upon magnetic sound film. The models are designed for mains synchronized operation and pilot tone or pulse-synchronized operation.<sup>228</sup>

A special model with a Vidicon camera provides for film performances on TV screens for transmissions or review purposes (installed at Real Film Studios in Hamburg). This application of a Vidicon camera on a projector has proved to be very useful in recording work when, for instance, it is necessary to record a music score or commentaries, etc., when there is no possibility of installing a projector. In such cases this equipment can be placed in some nearby room and connected to the television screen by an ordinary video cable. The camera can be exchanged with the ordinary lenses in very short time as it is fixed by one screw.

(A similar equipment for 35mm film is used by the Real Film Studios in Hamburg.)

Two 16mm projectors, as described above, can be used in a Multiplexer assembly for TV operation. The two projectors and a slide projector are mounted together on one base with a mirror device and a vidicon camera. This equipment allows changeover from one film to another or to a slide. The sound can be optical or magnetic, either magnetic edge track or center track on a separate magnetic sound film, as described above.

Magnetocord 16 M/R is used for double-system picture synchronized sound recording on perforated 16mm magnetic film with center or edge track and reproduction of such recordings with optimum tonal quality. Figure 52 shows two units linked together to make a duplex system for re-recording purposes. The Magnetocord apparatus consists of a film transport mechanism with a three-phase synchronous motor and a plug-in triple head assembly for center or edge track or with double-track heads and an amplifier cabinet with amplifiers, instruments and switching facilities. An optical sound reproducing set may be added for the reproduction of 16mm optical sound film. The Magnetocord Duplex equipment consists of two mechanically ganged recorders, master and slave, and is used preferably for re-recording of 16mm magnetic film with center track upon 16mm picture film striped with a magnetic edge track or vice versa. For re-recording of 16mm optical sound film upon magnetic film the slave unit may be additionally equipped with supplements for optical sound. The manufacturer is Siemens & Halske A.G., Karlsruhe.



### Moviphon

This is a new sound recording equipment for 8mm film, an attachment for the 8mm projector Movilux 8. It allows picture-synchronous recordings on conventional tape. The synchronism is achieved by a flexible coupling between the projector and the recorder (Fig. 53). The manufacturer is Zeiss Ikon AG., Kiel.<sup>259</sup>

### Progress in Television

Studio technique has benefited from the continued development and improvement of already approved equipment as well as from the more frequent use of the vidicon for film scanning.

**TV Cameras:** A new high-quality pre-amplifier was introduced to increase the photosensitivity by reducing the utilized signal current at a sufficiently good signal-to-noise ratio. A new super-iconoscope has been developed, operating with a reduced storage capacity and therefore requiring only  $\frac{1}{2}$  to  $\frac{2}{3}$  of the previous studio lighting. With regard to the practical use of the circuits for gradation control, which have also been built into these cameras, operational experience has still to be gained. The new super-orthicon camera is handier particularly in the case of outside recordings; an automatic temperature stabilization for the storage plate of the camera tube has been introduced. Production of the super-orthicon tubes of the types 5820 and OS 20 (corresponding to 5826) has been started by the Fernseh-GmbH at Darmstadt.

**Technique of Measurement:** Progress has been made in the station technique of measurement by employing electric test pattern generators and the test line method. Apart from many applications within the studios, the test pattern generators are also used particularly for test transmissions and for checking the radio links before program broadcasting.

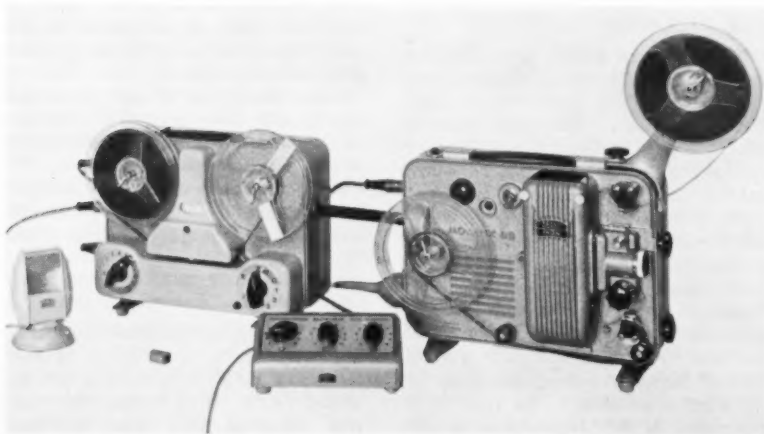


Fig. 53. Movilux 8mm Projector with Moviphon Sound Recorder, microphone and mixing panel.

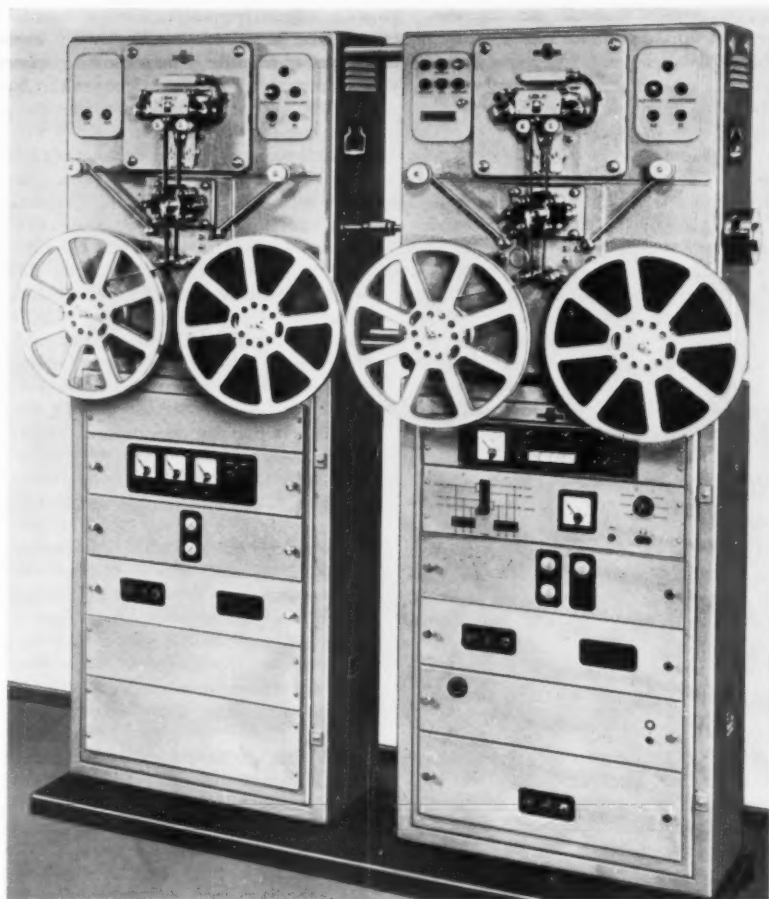


Fig. 52. Magnetocord Duplex 16mm Recorder-Re-recorder, master and slave.

**Magnetic Video-Tape Recording:** In Germany there is an active interest in the Ampex system, although it is recognized that it cannot meet all requirements of German television. Siemens & Halske, Karlsruhe, is the agent for Ampex in Europe and will deliver the first machines in the autumn, 1958, after the original

machines have been converted to the standard of 625 lines with 25 frames/sec. It cannot now be predicted to what extent video-tape recording will replace the photographic procedure.

**TV Film Technique, Other Than Film Recording:** Studios in the TV laboratories have shown that, under optimum production conditions, the 16mm film as to quality of picture, in particular with regard to definition and noise including TV film scanning, just corresponds to a good TV camera in the 625-line system. The main concern now is to coordinate the still young TV film technique and its small size of picture: e.g. by mainly reversal film, by avoiding faulty exposure during outside recordings, and by optimum development conditions (max. optical density, less than 1.6; gamma of the film, approx. 1.0).

For synchronous sound of outside film recordings and interviews, the pilot frequency method has been widely introduced. A conventional arrangement of portable 16mm film camera is used in this case, which with battery motor attains a sufficiently constant speed and a sufficiently low noise level, and which is

equipped with a small pilot frequency generator on the main shaft. In Europe, the pilot frequency is 50 c with a picture frequency of 25/sec. When the camera is operating, the pilot frequency is recorded additionally on a special soundtrack of the magnetic tape of a portable magnetic sound recorder — with magnetic perforation; therefore, the only things required are the pilot frequency head on the magnetic tape recorder and a thin junction cable between camera and tape recorder. Operation time and picture frequency of the camera are thus recorded on the tape and when later transferring the sound on the perforated magnetic film the pilot frequency serves to synchronize the drive of the magnetic film machine. A draft standard on the subject of the pilot frequency method (DIN 15 575) was passed last year.

Now 16mm reversal film is commercially available with sound stripe of solvent type, if desired. This stripe will undergo the photochemical treatment without being damaged and offers good magnetic sound properties. With regard to subsequent coating of completed films, preference is given to the pasting-in-method according to Weberling, where a thin tape of the exact track width of 100 mil is pasted into a 0.1-mil deep channel that has been shaped beforehand. The advantage of this method is that the soundtrack remains completely equal to the edge and that even splicing points of the film will pass without remarkable sound fluctuation. The laminated-tape method of the "3M Company" is being introduced as another means of film striping in the near future.

**Film Recording:** A TV recording should not introduce a perceptible loss of picture quality in comparison with live transmission; therefore, it must be better than the TV camera. Tele-recording is made on 16mm film according to suppressed frame method, i.e. with only half the information in vertical direction. Other operational experience with a 16mm fast pulldown mechanism (Marconi of England) has shown that TV recording with full picture information and with extremely quick pulldown (2 msec) is quite reliable in its operation, but due to the small size of the film, the full definition of the TV picture cannot be reproduced. Laboratory tests of TV recording on 35mm film have been made to procure a fast pulldown mechanism with a switching-time of less than 2 msec.

**Film Scanning:** Vidicon scanners have been used increasingly for 16 and 35mm film scanning. In this case, the vidicon is only hesitatingly employed in the studio for simple tasks, due to its lower definition and the persistence, but it has met with great approval. Apparatus capable of being combined to be used for

scanning diapositives and as studio cameras have been developed. The lack in sharpness of definition of the scanners is compensated by electric equalization circuits. Work is in progress to introduce an automatic lumen control.

Until recently the transmission of films with synchronous sound has been done with separate magnetic film (Sepmag type) and with synchronous drive of film scanner and magnetic film machine. The transmission of 16mm picture film with combined magnetic soundtrack (Commag type, corresponding to ASA PH 22.87, or DIN 15 681, respectively), desirable for its safe synchronization and the considerable operational facilitation, could not be done because existing film scanners with magnetic sound pickup did not give the required quality, especially the low fluctuations (wow). At the end of 1957 the first sample of a high-quality 16mm film scanner with first-class magnetic sound reproduction has been procured, which will permit the transmission of combined films (Commag type). It is the new vidicon-scanner of Fernseh-GmbH, which uses a claw-type intermittent and therefore offers good film steadiness and possibilities of adaption also to a higher density of the film.

**TV Episcopes:** Developed at the Institut für Rundfunktechnik, this apparatus permits direct transmission of opaque pictures, e.g. photos, newspaper cuttings, etc., without producing diapositives. For this purpose the raster of a cathode-ray tube is sharply reproduced on the paper to be transmitted and the diffusely reflected light is converted into an electric video signal by means of two multiplier photoelectric cells. The size of the frame may continuously be varied between 3 by 4 in. and 7 by 9½ in. This may also be done during scanning, where the definition of the transmitted picture remains absolutely unchanged. It is this latter property that makes the Episcopes apparatus particularly attractive for use in studios.

#### *Other TV Activities*

TV transmitter activity saw intensified completion of the transmitting network covering the whole area of the German Federal Republic. The radio links of the Deutsche Bundespost are actually changed to double-track links with most modern 4-kc equipment.

The great rise of television in Germany has brought the yearly output of receivers near the million mark. Apart from continuous improvements of the circuit technique, special operational improvements include better electrical stability of the sets by use of automatic control devices. Recently, tuning indicators for the exact adjustment of the receiver to the middle of the Myquist slope as well as differentiation equalizers to improve the sharpness of definition are more often

used. The present production consists almost entirely of sets with 17- and 21-in. camera tubes only.

Improvements in transmission of Euro-vision programs from countries with a different TV standard (405 or 819 lines, respectively) have been made with a vidicon-converter, which is a vidicon camera for 625 lines standard, taking the picture of a high-quality special receiver, which may be tuned to 405 or 819 lines, respectively.

The rising importance of industrial TV techniques saw several hundreds of equipments in use by the end of 1957, not only in big industry works, but also in science, in the shunting service of the Bundesbahn and with the police for traffic control purposes, the vast majority using the vidicon. Due to the variety of applications, often under extreme conditions, a "box-of-bricks" system, consisting of fundamental and additional equipment, has succeeded on the market, meeting varying requirements.

Planning for color TV has been carried out in German broadcasting by the Bundespost and by the Industry.<sup>280</sup>

#### **Great Britain<sup>281</sup>**

##### *Television in General*

During 1957, the coverage of the BBC Television Service was extended from 96.4 to 97.5% of the population of the United Kingdom. This was achieved by the following changes or additions to the BBC's TV transmitting stations which now number 18: (1) completion of the final aerial array of the London Television Station on the Crystal Palace site, increasing the e.r.p. from 120 kw to 200 kw; (2) opening of new low-power transmitters at Blaen-plwyf in Wales, Rosemarkie in Scotland, and Londonderry in Northern Ireland; (3) replacement of temporary low-power transmitters at Sandale in Cumberland and Douglas in the Isle of Man by permanent higher power installations; and (4) an interim increase in power of Norwich in East Anglia. The full power cannot be used until there is an increase in the power of the Belgian transmitter which shares the same channel.

Some small areas of high population density still have poor TV coverage. It is hoped that some of these can be served by unattended low-power frequency translators (receiver-transmitter installations). The number of TV licenses increased during the year from 6½ to 7½ million.

##### *Color Television*

In January, demonstrations of color TV were given to members of both Houses of Parliament, using a 405-line version of the NTSC system. Six prototype color receivers were provided, together with four monochrome receivers for comparison. For convenience

in viewing, it was necessary to arrange the demonstrations in such a way that the receivers would produce both monochrome and color pictures without adjustment by engineers. This was an extremely severe test of the stability of color balance in the receivers, since even slight variations in the color renderings given by different receivers would have greatly reduced the effectiveness of the demonstrations. In spite of this handicap the demonstrations were highly successful technically, and the program staff achieved remarkable continuity of production with equipment which had been designed for experimental use only.

A new series of regular color test transmissions from the London transmitter began in October. As with the previous test transmissions, these originate from the color cameras and film scanners in the experimental color studio at Alexandra Palace.

The purpose of this series of transmissions is: (1) to provide a source of high-grade color picture signals to permit color receiver development work to continue; (2) to enable further experience to be gained in the operation of a color studio and other color TV equipment; (3) to obtain further knowledge of the compatibility of the modified NTSC system; and (4) to investigate further the problems of color transmission and reception.

#### *Stored-Field Telerecording*

Two of the 35mm telerecording channels at the Lime Grove Studios have been modified to work on the stored-field system. These previously operated on the suppressed-frame system, in which each alternate field on the picture tube is blacked out electronically, thus allowing the time of a complete field scan to be taken up by the film pulldown. (In the 405-line, 25-pictures/sec system the television and film frame frequencies are synchronized.) In the stored-field system both fields are displayed on the picture tube, but each alternate field is displayed during pulldown time, while the film is shuttered. A long-persistence picture tube phosphor stores this field until pulldown is completed, when the shutter opens and both fields are exposed together. During the scanning of the stored field, the gain of the video amplifier is boosted in such a way as to compensate for the decay of the stored field between the moment of scanning and the commencement of exposure.

This method has the advantage of utilizing the existing suppressed-frame equipment to form the basis of a "full-information" system, and it gives a standard of quality which is probably among the highest of any of the methods for producing a telerecording which can be projected optically. Steps are also being taken to reduce density variations in the processing of films for telerecord-

ing and other television purposes. It seems likely that the BBC will continue to require a proportion of its recordings of vision signals to be on film, even when magnetic-tape recording equipment is available.

#### *UHF Experimental Transmissions*

The UHF Bands IV (470-585 mc) and V (610-960 mc) have not yet been used in the United Kingdom, but it is possible that they will be so required. Following earlier investigations in Band IV using low-power transmitters experimental high-power transmissions in Band V were begun in November (Fig. 54). It is hoped that the information which will be gained from these tests will throw light on the problems to be considered for future development.

The Band V transmitters now in use at Crystal Palace have klystron output stages (giving peak powers of 10 kw), a 12 by 6-in. elliptical aluminum waveguide, and a helical aerial mounted 700 ft above ground level giving a peak e.r.p. of 125 kw. The vision and sound transmitters are now operating on the British 405-line standards. Later the CCIR 625-line standard will be used in the tests, so that comparisons can be made. On 405 lines the video modulation is positive, the sound is amplitude-modulated, and the sound carrier frequency is 3.5 mc lower than the vision carrier at 654.25 mc. With the CCIR 625-line standard the vision carrier frequency will remain the same, but the video modulation will be negative, and the sound carrier frequency will be 5.5 mc higher than the vision carrier. The sound carrier will be frequency modulated.

#### *I.T.A. Coverage*

The coverage of the Independent Television Authority service was extended from 60 to 70% of the population of the United Kingdom. This 10% increase was achieved by the addition of Blackhill, the Scottish Station.

#### *Microwave Links*

A total of 214 temporary microwave links was established during the past year to service the various remote program requirements. In addition a microwave service was provided to transmit color television on the NTSC American Standards to enable demonstrations of medical techniques to large audiences in London, Manchester, Newcastle and Edinburgh.

#### *Associated-Rediffusion*

At Television House in the heart of London, two new studios were brought into service in January and June, known as Studios 8 and 9. Studio 9 is equipped with image-orthicon cameras using  $4\frac{1}{2}$ -in. tubes while Studio 8 is equipped with an unattended vidicon camera with



**Fig. 54. Experimental Band V transmitting aerial being hoisted to the top of the 709-ft tower at BBC's TV station, Crystal Palace, London.**

remote control of zoom lens, panning and tilting. The approximate floor areas are 800 sq ft in Studio 8, and 1,600 sq ft in Studio 9. The switching and dimming of the lights in both studios are controlled from a single console located in the lighting control room of Studio 9.

#### *New Studio Cameras*

Two further studios at Lime Grove have been equipped with cameras using Emitron CPS (cathode-potential stabilized) camera tubes, type 10764, which first came into service in the BBC in 1956. The new type 10764 tubes have average sensitivities greater than the earlier ones.

#### *Re-equipment of TV Theatre*

The BBC Television Theatre at Shepherd's Bush was brought into service again in July after extensive alterations and re-equipment. This theater is used for "light entertainment" productions in which large studio audiences are required. The old image-iconoscope cameras have been replaced by Marconi  $4\frac{1}{2}$ -in. image-orthicon cameras and new and completely re-equipped control rooms have been provided. The new lighting system incorporates centralized control of the switching, dimming and hoisting of the illuminators. Because the





Fig. 55. Marconi Telerecording channel Type BD679 (control position, front view).

new control rooms are immediately behind the rear wall of the stage, it is not practicable to provide observation windows giving a view of the stage. A Pye vidicon industrial TV channel has therefore been installed with its associated picture monitors in the control rooms, and the camera positioned to give a view of the whole stage. This channel operates on closed circuit, independently of the transmission cameras.

#### Regional Studio Centers

Permanently equipping the regional studio centers has the general aim (apart from variations in some individual centers) of providing each region with the following facilities: (1) a full-size studio with three permanently installed working image-orthicon cameras; (2) a separate interview studio with two vidicon cameras; (3) "crossfire" TV film projector installations with photoconductive tubes, for 16- and 35mm film; (4) a film unit with 35- and 16mm cameras, processing, and cutting room facilities.

Permanent studios are in operation at Bristol and Manchester, together with temporary interview studios. Temporary studios are also in use at Birmingham, Belfast and Glasgow, while a "drive-in" studio is now in use in Cardiff. This last-mentioned is equipped for TV productions by the mobile unit based in Wales. The unit is driven alongside the building and only the cameras moved into the studio.

#### Radio Camera

A Radio Camera, purchased from the French Compagnie Générale de TSF, consists of a hand-held vidicon camera, and a pack containing the camera control unit, transistorized waveform generator, and 100-mw VHF transmitter. Another pack contains a 12-v battery power supply and a transistorized high-tension supply generator. The total weight is about 30 lb and the size and arrangement of the packs are such that they can be comfortably and conveniently carried by one person. A range of 300-400 yards is achieved with the 100-mw transmitter but with additional packs containing a 5-w transmitter and an extra battery the range is increased to 2 to 3 miles. The total weight then becomes about 50 lb.

#### Marconi Equipment

A new Marconi 16mm Telerecording Channel, Type BD679, was introduced and is in operation in the ABC Television Ltd. studios at Manchester, England (Fig. 55). The Marconi 16mm fast pull-down camera is used in this channel, operating at a pulldown time of 2 msec. This camera, fitted with optical sound, is in operation at the BBC, Lime Grove. Other principal users of the Marconi 16mm Recording Channels fitted with the mute edition of this fast pulldown camera are Amalgamated Television Services, Sydney, Australia; and Bayerischer Rundfunk, Munich.

Excellent results are being obtained using a standard reversal stock with a speed of 15/10 degrees DIN such as Agfa Isopan F or Perutz U15. For negative/positive operation, the use of Kodak 7374 processed to the reduced gamma of 0.8 has resulted in a large reduction of the film grain. This same film has also been used successfully as a direct positive.

The Broadcast Vidicon Channel Type BD864 is a unique vidicon camera channel, of a very high performance, suitable for broadcast or other services. This compact and low-weight camera has a four-lens turret taking either standard type C-mount lenses or a range specially developed to cover adequately the 1-in. vidicon. Alternatively, a zoom lens can be supplied. The novel feature is that all signal processing circuits are in the camera so that only power and pulses are fed up the camera cable which returns a ready-to-use composite signal. To monitor the signal is a large rectangular viewfinder and a waveform monitor associated with the operational controls on the back of the camera. Thus, one man can operate the camera, including the small amount of video controlling necessary; however, if it is desired to have a separate video operator, then an operating control panel is supplied mounted with a picture and waveform monitor to provide a conventional operating position.

The Industrial Vidicon Camera Channel Type BD835A is a new industrial camera with a camera head in the form of a cylinder about 4 in. in diameter. This has a single lens for a variety of fixed lenses, or a zoom lens and focus can be remotely controlled. This camera head will mount into a variety of special enclosures required for particular applications (Fig. 56).

#### Ernest F. Moy Ltd.

This firm is producing four types of telerecording film cameras for commercial and BBC use as follows:

*Type 1*, known as the R.P.15, is a 16mm camera, driven by an accelerator unit which gives the film a pulldown time of 1.4 msec. It is used for the recording of interlaced scans as broadcast. Single-sided perforated film is used but sound recording is not incorporated. Dowel pins register the film during exposure. Magazines of 2,500-ft capacity give 1 hour of continuous recording (Fig. 57).

*Type 2*, known as the R.P.30, is the 35mm version of the same camera, but the pulldown time is, in this case, 2.8 msec. Sound recording is again omitted. Registration of the film during exposure is again dowel pins. This camera is being used on closed-circuit recording, with sequential scan. Magazines to hold 4,000 ft of film, giving 1 hour continuous recording, can be supplied if desired.



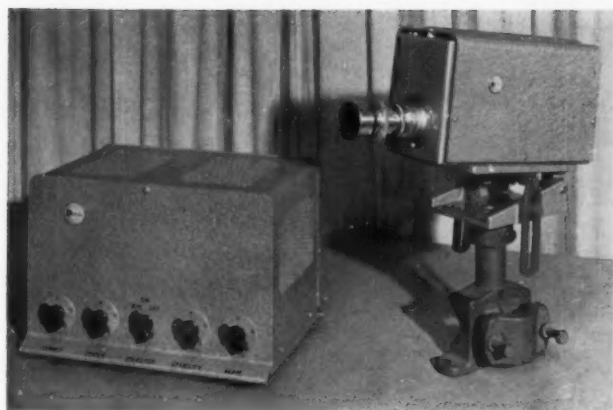


Fig. 56. Camera and Control Unit for Marconi Industrial TV equipment, Type BD835A.



Fig. 57. The R.P.15 16mm Camera produced for BBC by Ernest F. Moy Ltd., manufactured for High-Definition Films Ltd.

They are of similar design to Type 3 below.

Both the above cameras are being manufactured for High-Definition Films Ltd., London.

Type 3 is a 35mm camera in many respects similar to Type 2 above, and is shortly to go into service with the BBC. It is fitted with the B.A.F. Ltd., Optical Sound Recording System, and will be used for the recording of interlaced scans as broadcast. Two single magazines which are interchangeable, either as unexposed or exposed, are mounted on a framework above the camera. By this means a magazine partly loaded with exposed film can be removed for processing and replaced by an empty magazine on the exposed side.

Type 4 is a 16mm camera for suppressed-frame recording, and it is fitted with B.A.F. Ltd., Optical Sound Recording System. The drive unit for this camera enables pulldown and registration to be completed in less than 1/50 sec, giving more than 1/50 sec for exposure. Registration is again by dowel pin (Fig. 58).

Both the above cameras are being manufactured for the British Broadcasting Corp.

Future developments lean towards the provision of 1.4 msec pulldown on the 35mm cameras.

#### *Telerecording*

Over 1,000,000 ft of program material has been telerecorded during the past year, some of our programs being pre-recorded and not transmitted as a live show, which permits editing and allows the tempo of the program to be increased. In addition to the above, we are at present installing equipment to enable telerecording to be made on standards higher than those used for broadcasting. The equipment in one of

our studios is being modified to enable it to be used on both broadcast standards and higher standards, the change-over being accomplished by simple switching arrangements. This will enable tele-recordings to be made which are not limited in quality by Broadcast Standards, and it is expected that recordings of superior quality will result from the use of this method.

#### *Mobile Units*

Five remote units are operated by the one company, each being equipped with three image-orthicon cameras using 3-in. tubes. These have recently been supplemented by the addition of a portable television camera and transmitter, all of which is self-contained and can be carried by one man in the form of a back-pack. The range of the transmitter is of the order of 1,000 yards.

#### *Master Control*

A completely new master control was brought into service at the beginning of the year and this is capable of accepting 15 separate video and sound inputs and feeding out three independent video and sound outputs. These facilities are necessary in order to accommodate the increasing network commitments. An interesting point in connection with the master control is that the changeover from the temporary to the new master control was completed in a single week-end without any hitches.

#### *Film Stock*

All manufacturers seem to have found the use of a lubricated super coat necessary for camera negative. Due to "large screen" pressure most manufacturers also seem to have achieved a remarkably noticeable decrease in graininess and improved resolution in their negatives, viz. Kodak Plus X Type B, Ilford FP3,



Fig. 58. Type 4 16mm camera for suppressed-frame recording, Ernest F. Moy Ltd.

Gevaert Gevapan 30 all show this improvement.

#### *Laboratories*

The Rank Laboratory at Denham has adopted a policy of release printing direct from the VistaVision-type camera negative, using reduction printers of special design. It was decided that this was the only way to retain the superlative definition and other advantages of the large-size negative: to go through a duplicate or internegative and thereafter print ordinary 35mm standard contact seemed retrogressive.

The design and building of a suitable printing machine was no mean task, because optical printing is very prone to reproduce the slightest blemish on the original negative, which would not show if printed by contact. This meant the construction of a printer projection head with an eight-sprocket pulldown, giving the minimum wear on the original negative after passing through the machine for three or four hundred times. The negative would have to be in 2,000-ft lengths, which required special take-up



Fig. 59. The Rank Organization's double-head optical reduction printer.

construction to avoid cinching, and it would be essential for the negative to pass backwards and forwards in order to avoid the continual business of unloading and rewinding and loading again. It was imperative that light changes were operated electronically, thus avoiding any notching of the original negative. The cleaning device would have to be introduced so that during the passage of the film through the machine, any dust particles were eliminated.

The appearance of the prototype machine changed considerably during its long period of testing, but in the end a very fine machine resulted of which twelve are now in continual operation.

The use of anamorphic lenses also makes it possible to supply squeeze prints with ease. The lenses for these machines were specially designed and manufactured by Taylor, Taylor & Hobson and are claimed to be the finest reduction lenses ever built. The Rank Laboratories' VistaVision Printers were designed by the Organization's own engineering staff and built by the Parkfield Engineering Co. of Great Britain, with the exception of the 35mm standard Bell & Howell cameras which are used on the positive end of the machines.

Another machine also specially designed and built by The Rank Organization is a double-headed projection optical printer (Fig. 59) principally used for the simple and speedy marry-up of traveling matte shots. This machine can be used for many other multiple exposure jobs, and has the great facility of being able to project the combined marrying-up onto a small screen, which enables the operator to arrive at a perfect line-up and even density balance between foreground and background with great ease, and thus

eliminate out repeated tests. The separate console controls light source, speed, reverse or forward, at any machine head; in fact all the switching is done on the console and not on the machine itself. The projection heads are shuttle gates, while the camera is a standard Mitchell. Here again, Taylor, Taylor & Hobson designed the special prism and lenses for the machine, and Parkfield Engineering Co. were responsible for the building.

This laboratory has also installed a contact liquid immersion printer similar to that described in the October SMPTE *Journal*.<sup>110</sup> The results are quite outstandingly successful.

Ilford Limited have produced a small silver recovery unit of revolutionary (literally!) design, the rotating cathode taking the form of an Archimedian screw. This company has also produced a Silver Estimator Pack to give an accurate measurement of silver concentration in the fixer (Fig. 60).

#### Exhibition

The popularity of the line source reproducer and the use of delayed sound reinforcement is growing. A vertical stack of line source speakers gives a very broad horizontal beam and narrow vertical beam which proves most useful for difficult acoustic layouts such as a low under-balance area.<sup>262</sup>

A good deal of work is being carried out in the development of germanium diode and silicon rectifiers for cinema arcs, although no commercial item has yet been announced.

The British Thomson-Houston Co. Ltd. has marketed a 16mm sound projector Type 450X with a 2-kw xenon arc. The arc is instantaneous striking and at 5600 K is very close to the carbon arc.<sup>263</sup>

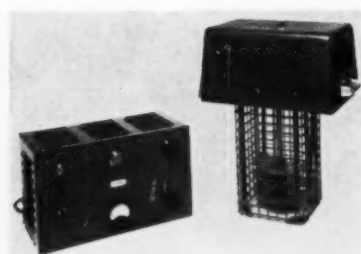


Fig. 60. Small silver recovery unit, Ilford Ltd.

#### Studios

For 35mm production the major studios have standardized 35mm magnetic recording up to dubbing stage and have agreed not to use 16mm or 17.5-mm. This has had a useful effect in that apparatus manufacturers have been thus persuaded to produce a most useful range of equipment such as sound editing and similar cutting room equipment.

The use of radio telephone for direction control is growing, and in large crowd work is proving a great boon. For the crowd scenes in *Dunkirk*, for example, Ealing Studios used 56 "walkie-talkie" sets on three different channels.

A new type of crab dolly has been produced by Creighton and Partners Ltd. It enables the camera to track in any direction and will take cameras up to VistaVision weight.

#### India

A brief report is available through a visit to Hollywood of A. S. Patel, head of several associated motion-picture industries in India. More than 300 feature films are now produced annually in India — more than Hollywood's production; moreover, Indian films are two to three times as long as U. S. features. Theater admissions are from 6¢ to 20¢ in U. S. equivalent. Most projectionists edit and cut sizable portions. Pictures have long runs, less than two to three months steady run being considered a financial failure.

Indian producers are purchasing much motion-picture film from Russia. Quality is reported to be inconsistent throughout a roll, considerable waste resulting, but this being described by the manufacturers as justified because of the extremely low price of the film.<sup>264</sup>

An experimental TV station is to be set up with the aid of a \$25,000 allotment from Unesco.<sup>265</sup>

#### Italy

Last year it was not possible to get a report from Italy in time for publication; therefore this year's report is made as large as feasible.

During early 1957, the Italian Broadcasting and TV Co. (RAI-Radio-Televisone Italiana), which started

operations with a single experimental transmitter in 1949, completed a national network. On account of the mountainous configuration of the Italian peninsula, some isolated valleys of the Alps or the Appennines do not receive TV programs yet, but a continuous effort is being made to build up new local transmitters, which are expected in a few years to cover every location in Italy.

The Italian TV standard is 625 lines; frame frequency, 25. The interlacing scanning has a field frequency of 50/sec. The channel bandwidth is 7 mc. including the FM sound. The vestigial side-band system is used in transmitting video signals, while the spacing between picture and sound carrier is 5.5 mc.

The map of Italy (Fig. 61) shows locations of the various transmitters, as well as that of the repeaters and the microwave or metric wave connections. There has been a gradual increase in the number of main transmitters, local transmitters and repeaters from 1949 until 1957. The number of subscribers has recently reached a figure of 400,000, and it is rapidly increasing since new transmitters in the South, in Sicily and Sardinia, started operations.

The Italian transmitters operate on eight different channels, two of which are in the so-called lowband. One operates on the 81-88-mc channel (which in some other countries is used for FM broadcasting), while Italian FM broadcasts are on frequencies of 88.3 to 99.9 mc), and five channels are in the high-band (174 to 216 mc).

The main transmitters have peak antenna powers which range from 250 w to 10 kw. The radiation pattern adopted for the antennas depends naturally on the shape of the area to be serviced. In some cases this pattern has a circular form, but in many instances it has an elongated shape in order to suit the requirements of the terrain. The local transmitters, which cover only a small district, have usually smaller antenna power, from 200 w down to 5 w or even 1 w. They are entirely automatic in operation and consist of a receiver, frequency converter and transmitter.

All these transmitters operate on a single program, and they are all connected by a two-way microwave system, which consists of two FM video channels, of a 20-mc bandwidth, working on the center frequencies of 900 and 940 mc. The microwave relay transmitters, which have the "line of sight" type of operation, have antenna powers ranging from 8 to 20 w, according to the distance to be covered. They are located on the mountain tops and are provided with high-gain horn-type antennas. The same antennas are used for the two audio channels, which operate on center frequencies of 1510 mc (frequency modulation with a bandwidth of 10 mc). The connection between the mainland

and Sardinia, on account of the sea-surface curvature, has been effected by means of FM metric waves. The map (Fig. 61) shows with dotted lines some more connections in the South of Italy

and in Sicily which, due to obstacles in the optical path, had to be effected with ultrashort waves.

Studio programs originate either from Milan (five studios), from Turin (one



Fig. 61. TV Network in Italy, courtesy of RAI-TV.



Fig. 62. Master control room of RAI-TV, Milan.

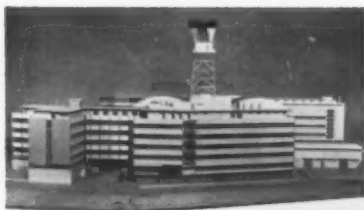


Fig. 63. Model of new TV Center in Rome, with tower for microwave links.

studio) or from Rome (two temporary studios and one theater). Figure 62 shows the master control room in Milan used for switching and mixing operations.

A large TV center is being built in Rome, and a model of it is represented by Fig. 63. A part of this new building already in operation contains two sound studios for dubbing sound into documentary films, newsreel and foreign films. It is expected that the new studios will all be in operation before this report is published.

Programs originating from other locations are transmitted by means of mobile units. Each unit is provided with three TV cameras, sound pickup and control equipment, recorders and relay transmitter equipment. For the recording of programs, both the Milan and the Rome studios are provided with tele-recording equipment, consisting of recording cameras which operate either on the suppressed-frame principle or by means of special kinescopes with storage tubes. Sound is separately recorded on magnetic tape. Film programs are transmitted by means of projectors which make use of the flying-spot scanning system. Figure 64 shows the film transmitting equipment, with associated amplifiers and monitoring facilities installed at the Milan Studios.

It will interest some readers to know that whenever some event of international importance takes place in Italy or in some other European country, the TV network of Italy and of other countries can tie into Eurovision which has been described in the *Journal*, including its potentialities and its standards problems.<sup>266</sup>

#### Theater Television

Some of the Italian TV programs, like the local version of "Double Your Money or Quit" (a quiz program which is telecast on Thursdays), have acquired such popularity that it became important for theater exhibitors, who did not want to lose a large portion of their patrons on Thursdays, to give their audience some sort of reproduction of this program. Many exhibitors resorted to the use of several 21-in. or 24-in. receiver sets mounted below the screen or along the lateral walls; but some theaters installed regular large-screen TV sets, like the one



Fig. 64. Film transmitting equipment in Milan; projectors operate on flying-spot principle.

represented in Fig. 65. Such a projector, incorporating the cathode-ray tube and the projection optics of the Schmidt type, is often installed in the balcony of a large theater.

Cinemecanica makes the following types of TV projectors:

- (1) Type C100, incorporating a 7-in. tube (7 NP 4) working at 80,000 v, with a 680-mm mirror and 540-mm lens;
- (2) Type C90, using a 5-in. tube (5 AZP 4) operating at 40,000 v, with a 355-mm mirror and a 240-mm lens;
- (3) Type C87, using a 5-in. tube (5 TP 4) operating at 30,000 v, with a 355-mm mirror, and a 240-mm lens.

The electronic equipment is divided in a number of separate units: high-frequency receiver, with incorporated sound preamplifier, which in the theater is connected to the projection power amplifier; video amplifier; synchronizing and deflecting section; low-voltage power supply; high-voltage power supply. A safety device kills the high-voltage supply in case of failure of one of the components of the deflecting section.

Types C90 and C87 are usually mounted on a dolly, with the projector proper, as shown by Fig. 65, since the limited projection throw (21 to 27 ft) requires that the equipment be set up in the center aisle of the theater orchestra; the projector of Type C100, which has a longer throw, can either be mounted on the balcony or suspended from the ceiling, and the associated electronic equipment is accommodated in the booth.

Type C87 gives an image of 11-ft maximum width on the screen; with Type C90 an image of 16-17-ft width can be obtained; while Type C100 can be used for an image of 22-24-ft width. There are 250 of these large-screen TV projectors already installed in theaters in Italy and other European countries.

#### New Developments in 35mm Projectors

Cinemecanica has developed a new type of 35mm projector, called Victoria X, which with some minor changes (sprockets, gate, lens and magnetic head) can be adapted for 70mm projection according to the Todd-AO system or similar system. The new projector incorporates some features which are calculated to make the projectionist's job easier in changing from one type of presentation to the other: a turret, on which three different lenses, including a hypergonar lens, can be mounted, allowing a quick change from standard to CinemaScope or wide screen to be made; by means of an interchangeable aperture the change in aspect ratio can be effected almost instantly; the curved gate is designed to keep standard film as



Fig. 65. Large-screen TV projector, Model C90, by Cinemecanica, Milan.



well as wide film in tension, avoiding any film buckling; water cooling for the metal parts and air cooling for the film are provided; the magazines have a capacity of over 6,000 ft. Figure 66 shows details of the lens turret.

The Microtecnica Co., Turin, has built a new projector, with horizontal film travel, for showing pictures printed directly from Technicolor "Technirama" negatives. The system's specifications and possibilities have been outlined briefly in the *Journal*.<sup>267</sup> Several problems had to be solved in the construction of this new projector, especially as regards the intermittent movements; since film speed is twice the standard speed, all parts of the Geneva movement are subjected to higher accelerations and strain. The anamorphic lens used for the new projector is a special Delrama development (of the Oude Delft Co. of Holland), with ratio 1.5 : 1, while the back lens has a diameter of 100 mm, in order to cover the increased frame size.

The Titanus film, *Montecarlo*, produced in Italy with the Technirama system, was shown on the new projector at the Reposi Theatre in Turin, a house seating 3,000, on a screen of 69 by 29 ft, giving the best definition so far obtained in this country.

The firm of Ing. Angiolo Fedi, Milan, brought out a new model of its Fedi XII S Projector, the new projector having a new lens system for wide-screen projection in three different focal lengths, and new cooling and heat-absorbing features.<sup>268</sup>

Cinemeccanica has also developed a new automatic-feed arclamp, with a 450-mm mirror which uses an 11-mm copper-coated positive carbon and an 8-mm negative carbon, reaching 120 amp. The screen lumens that can be obtained from this new lamp are reported above 17,000.

A new line of arc converters, with the



Fig. 66. Detail of lens turret in Cinemeccanica Victoria X projector.

special excitation characteristics shown in Fig. 67, has been put on the market by the Marelli Co., Milan. When the arc is struck, the voltage is strongly reduced, thus avoiding the projection of metal droplets that could pit the mirror. Good voltage stability is obtained due to the dropping response, which compensates for the negative resistance characteristics of the arc gap. These converters are built in 55-, 80- and 120-amp sizes.

#### 16mm Projectors

A new 16mm projector, with optical and magnetic sound reproduction, designated the Micron 600, is now made by Microtecnica, Turin (Fig. 68). An interesting mechanical feature is that the projector consists of three entirely separate units which are mounted on a supporting base: the film transport mechanism, with projection lens, sound optical system and magnetic head; the lamp

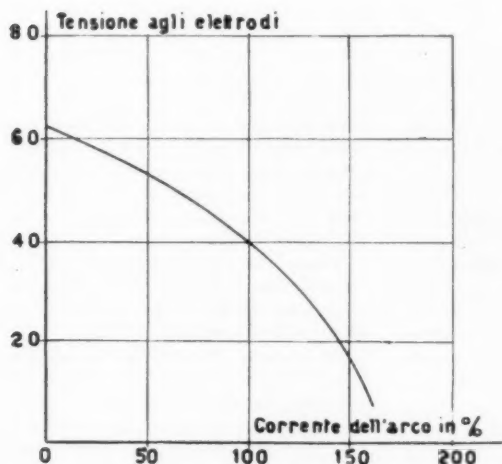


Fig. 67. Excitation curve of SIGMA arc converters, by Marelli Co., Milan.



Fig. 68. Micron 600, 16mm projector with magnetic and optical sound, by Microtecnica, Turin.

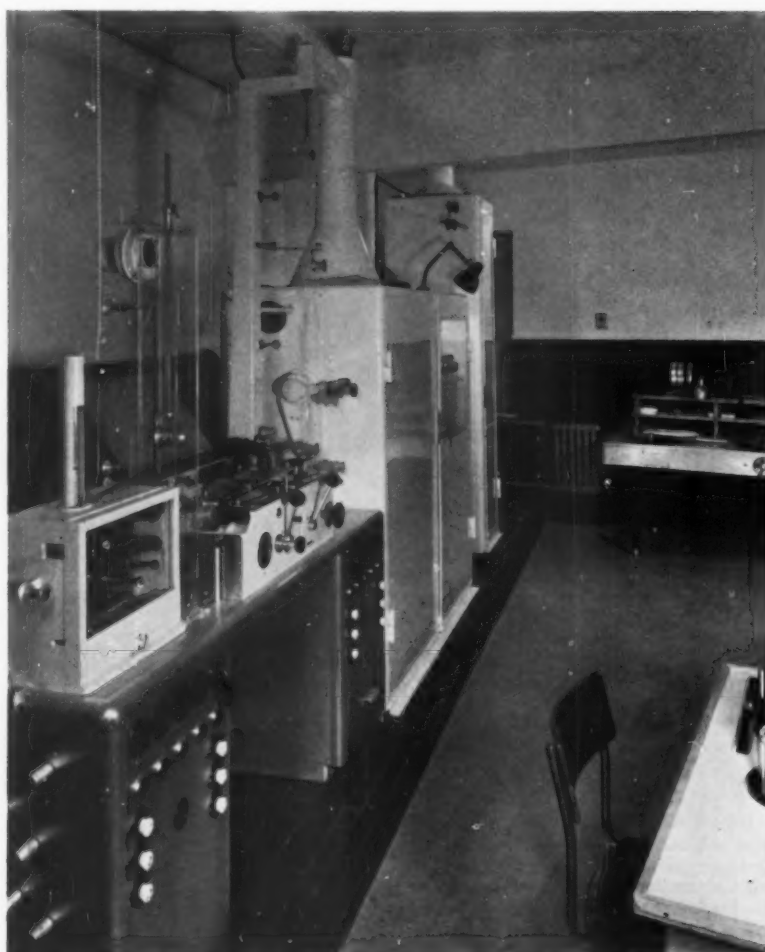


Fig. 69. Machine for superimposing subtitles on color or black-and-white prints, manufactured by Cinetyp of Bern, Switz., used at Tecnostampa, Rome.

with its cooling fan and the motor; the amplifier with associated controls. Repairs or replacement of defective components is made much easier by this arrangement. The projector is equipped with a lens of 1-1.2 aperture, it can use either 1000-w or 1200-w lamps, and the amplifier has an output of 25 w with less than 1% harmonic distortion. Film is cooled by an air jet and a special device allows the projection of a held frame, with reduced light flux, during several minutes.

#### New Film Emulsions

The Ferrania Co. has put on the market the following new films: (1) black-and-white reversal Type 37, 16mm; this new panchromatic reversal film is particularly suitable for TV; sunlight speed is 400, tungsten speed 320; the shape of the H&D curve corresponds to the optimum conditions for TV reproduction. (2) Ferrania fine-grain reversal panchromatic duplicating, 16mm; this new type has an improved definition. (3) Ferrania magnetic films

in 35mm, 17.5mm and 16mm. (4) Ferranicolor reversal for tungsten light, 16mm; the emulsion of this color film is balanced for a color temperature of 3200 K; its speed is 20.

#### Film Laboratories

Color processing facilities have been greatly improved beginning in 1956, with the installation of auxiliary equipment for superimposing titles, magnetic striping, lacquering, etc.

Tecnostampa has put in operation a new high-speed developing machine which can handle about 6500 ft of color positive per hour. This machine is equipped with electronic apparatus which controls the temperature of the various solutions and stabilizes the speed of the applicator wheel used for soundtrack redevelopment. A second machine of this type is being installed.

A new continuous color printer which works at a speed of 4200 ft/hr is now in operation. Light or filter changes are effected in a time which corresponds to a fraction of a frame by means of a high-

speed relay system which is controlled by means of a conductive patch applied on the splice.

Figure 69 shows the new subtitling machine, manufactured by Cinetyp of Bern, Switzerland, which is used for superimposing titles on color or black-and-white prints. The Cinetyp machine first applies a protective wax coating to the film, then removes with hot punches the wax in the area which will be occupied by the lettering, then attacks with an acid the emulsion and gelatin of this area, and finally removes the wax from the residual film area.

A Tecnostampa film-lacquering machine works at a speed of 2200 ft/hr, controls the thickness of the lacquer coating by a precision micrometer, and automatically removes dust from the film surface previous to the lacquering operation.

Considerable progress has also been made in the production of color separations, which are now exposed at a rate of 12 or even 16 frames/sec.

The SPES Laboratories have built a new type of continuous printer, with additive color correction. A split-beam arrangement is used, by means of which the light of a single 1000-w lamp is divided in three beams, each one of which is filtered through a glass filter of one of the fundamental printing colors. The intensity of the individual beams is controlled by means of diaphragms which are actuated by a mechanical transmission. Instead of a control strip with subtractive filters, these machines use a control bar with three rows of cylinder head brass bolts, whose height controls the position of a transmission lever. The color filters have been supplied from Germany by Schott. The same laboratories have installed a Reeves Soundcraft machine for the magnetic striping of CinemaScope prints.<sup>269</sup>

#### Japan

1957 was a highly rewarding year. Boxoffice admissions zoomed to a record total of 1.15 billion ticket buyers, with grosses totaling 68 billion yen (\$188 million). A total of 443 features were released, slightly under the 1956 total; but there were 84 features in color, a three-fold increase; 70 domestic productions were wide-screen, 35 of these in color. The total of 312 newsreels was the same as the previous year.

During the year, 712 new theaters were built. There are now 6,844 theaters in Japan according to the Japan Motion Picture Producers Assn.

In general, there was less building of deluxe theaters. The new Piccadilly Theater building in Tokyo features a cinestage main theater, complemented by the Marunouchi Shochiku theater on a lower floor. An escalator and a grand staircase handle traffic from the street to this theater. The first equipment in-

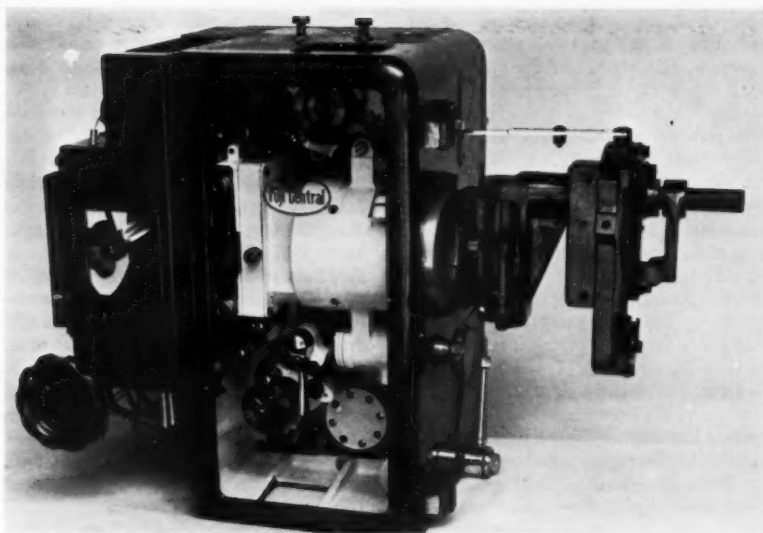


Fig. 70. The Fuji Central F-101 Projector.

stalled was for showing the Todd-AO *Around the World in 80 Days*, with surround speakers activated from Perspecta-duced supplementary soundtracks.

Yomiuri Grand Hall is a plush 1,500-seat theater in the new Yomiuri Kaikan building which also has a supplementary theater seating 500. In October, Toho Company opened a new home office building in Chiyoda-ku, with two smartly designed theaters. At the same time in Osaka, the new Nangai Daigekijo opened with three theaters of graduated sizes under one roof, the largest equipped for Todd-AO like Tokyo's Piccadilly Cinestage. Shochiku Company also opened three theaters in an impressive Osaka Shochiku Kaikan structure.

#### 35 mm Exhibition Equipment

The open-running mechanism design was generally forsaken for fully enclosed types with other proven modern features. At the close of the 4th Asian Film Festival in May at Tokyo, the 3rd Motion Picture Equipment Exhibit was held, and here five manufacturers demonstrated six production models of all-new designs.

The Fuji Central F-100, made by Fuji Precision Machinery Co., is an air-cooled self-lubricated mechanism of generous proportions. Late in the year it was succeeded by the F-101 model (Fig. 70) which had these changes: from a flat to a curved gate; from barrel to conical shutter; lens mount to accommodate 4-in. diameter objectives; water-cooled film trap; improved hermetically sealed casing.

Komitz Industrial Co. also brought out a new projector featuring automatic pump-circulated and dual-filtered oil-spray lubrication; conical shutter, water-cooled film trap; built-in electric changeover; and a screen-scope focusing aid (Fig. 71). Film buckle safety trip features

are included and the film gate provides for tension shoe pressure adjustments during operation.

The first enclosed-head mechanism manufactured in Japan was made several years ago by Nissey Projector Corp. of Hiroshima which has just introduced its newest model KZ with an especially ingenious design for threading ease. Film trap water-cooling is provided, as is also pump-spray lubrication, although the intermittent requires separate oil-filling action. A conventional rotary 2-blade rear shutter is employed with an electric changeover mounted on its housing (Fig. 72).

All the foregoing head mechanisms require addition of separate optical soundheads as well as provision for magnetic heads, available in full equipment lines of both Komitz Industrial of Tokyo and Nissey Projector Corp., but not from Fuji Precision Machinery whose Fuji Central projector mechanisms generally are combined with Victor Company of Japan sound systems both for domestic and export trade. In contrast, three manufacturers offered in 1957 four all-new models of enclosed projectors integrated with optical soundheads. Toa Electric Co. of Kobe introduced the Crown A-1 sound projector which is wholly up to date in all features and apparently superior to others with its nicely styled and designed film path which is almost completely sealed from the upper to the lower magazine.

Victor Company of Japan, heretofore exclusively concerned with sound reproduction equipment, introduced in May the All-Japan sound projector, essentially a licensed copy of Radio Corp. of America International Division's All-American equipment.

The Projector Dept., Fuji Trading Co. of Tokyo and Kobe, was the third manu-



Fig. 71. Royal projector, designed for magnetic soundhead attachment, Komitz Industrial Co.

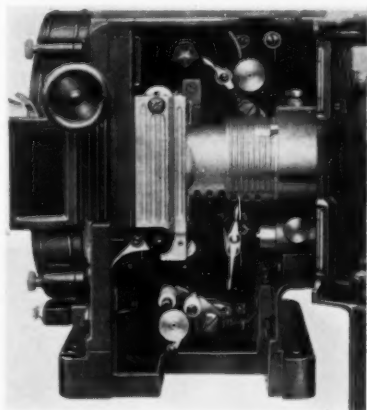


Fig. 72. Interior of Nissey KZ 35mm projector head.

facturer to produce a composite projection and optical sound mechanism — their Super B-8 and deluxe Super F-10 models. Both models have the features of pump-actuated filtered oil-spray lubrication to all moving parts including the intermittent tank with hermetically sealed casings; water-cooling of the film trap; cylindrical light shutter combined with butterfly-wing type of automatic fire shutter. In addition, the F-10 model (Fig. 73) showed really striking originality in its extra design features including built-in semiautomatic operational controls and electric interlocking safety features.

Nippon Onkyo Seiki Co., who initially introduced their Auto-Conductor fully automatic, dual projector controller system as an accessory during the 3d Motion Picture Equipment Show, an-



Fig. 73. Super 35mm Projector, including F-10 integrated sound projection head, Fuji Trading Co.

nounced late in 1957 completion and successful field-testing of the prototype device incorporated into their Nikkyo pedestal and the New Star projection head, to be in limited production early in 1958.

Shinkyo Electric Industrial Co., Tokyo, announced its GR-MPS-1 35mm

transportable dual sound projection set with unique design features developed in conjunction with, and for application by, Army and Air Force Motion Picture Service — Pacific, to serve battalion-sized military organizations. This equipment (Figs. 74 and 75), fitted with 1,500-w incandescent lamp-houses, is claimed to be the first packaged set in the world basically designed as a dual sound projection system which is readily transportable and capable of assembly out of suitcase-packed carrying cases for operational readiness in short order at virtually any location, yet maintaining full professional standards of projected image and sound reproduction performance.

Total sound flutter content is said to be held as low as 0.12% by a tight-loop design incorporating a pneumatic dashpot filter. Although the projector mechanisms are ruggedly built, head weight is kept unusually low through use of all-aluminum die-cast housings and center-frame. The base support design is unique in having a crossbar tie between twin pedestals and a two-level stand mounting sound amplifier and power controller. This set is intended for universal application from simple two-wire electric service of either 50- or 60-cycle frequency on delivered input voltages ranging from 80- to 125-v with a peak demand less than 2 kva. Its application is providing superior entertainment service for American military units in remote areas of the Far East where heretofore only 16mm service could be provided.

After the considerable progress in theater sound reproduction reported a year ago, this year there is but one item: The Hazama Electric Co. added a line of theater reproducer mechanisms which included their PL-3000 24-in. diameter low-frequency speaker, and a unique design of PH-1000 high-frequency driver fitted with a rectangular-shaped flat diaphragm and a one-turn aluminum voice coil having impedance of only 0.007-ohm at 400-c, necessitating a special coupling transformer for matching this HF driver to its associated crossover network. The PL-3000 is rated for limited low-frequency range of 20 to 300 c and its 24-in. diameter cone (overall frame diameter is 30 in.) is claimed to have principal-free resonant frequency of 26 c. Voice coil is of 2-in. diameter rated at 15-ohm impedance at 100 c, working in permanent field of 11,700-gauss magnetic flux.

For the projection illumination, two new arclamps appeared on the market, both being angle-trim rotating positive carbon types with 16-in. diameter reflectors. The HyperRex marked initial venture of Sansha Electric Manufacturing Co. into arclamp manufacture to supplement their well-known line of Super San Rex selenium arc rectifiers; while the Brian Super Power lamp from Nanao Seiki Co. adds the third competitive brand of rotating positive arclamp after the initial New Star Type V noted in last year's report. While design influences could be seen as taken re-

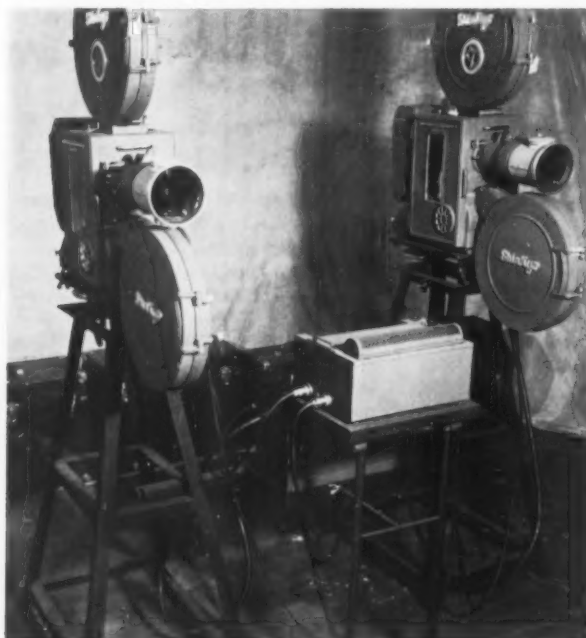


Fig. 74. GR-MPS-1 35mm transportable dual 35mm sound projector set assembled for operation, Shinkyo Electric Industrial Co. (U.S. Army Signal Corps photo, SP/3 Kenneth L. Peiffer, Jr., Zama Signal Corps Photo Lab., Long Lines Bn., Japan)



Fig. 75. Shinkyo 25-w amplifier and operating power controller assembled as part of GR-MPS-1 35mm transportable sound projector set (same credit as Fig. 74).



spectively from two prominent American lamp models, in no sense is either the HyperRex or Brian lamp mere copy-work, for each contains originality of layout and operating convenience, and is newly designed from base-plates up. Each lamp is intended to mount 11mm positive carbons as maximum size, operated at not exceeding 130 amp.

At its 10th anniversary celebration in Osaka, Sansha Electric formally announced the initial production run of a new 16mm transportable arc rectifier delivering adjustable d-c output from 20 to 35 amp, as the final completing link in the company's line of selenium arc rectifiers for every possible application of motion-picture carbon arc lamp exhibition. Initial production of this rectifier which incorporates single-phase input bridge rectifier circuitry, nearly all went to export demands in which this company topped all other Japanese motion-picture equipment manufacturers in both numbers of units (over 500 total, of all models) exported and in range of foreign country markets served.

Yamada Kogaku Kaisha, Ltd., of Kawagoe City, Saitama Prefecture, has arclamp reflector products which have made this company the giant of its field in the Asian equipment industry. A current innovation on its 16-in. diameter second-surface glass reflectors is the addition of a thin aluminum sheet backing. The manufacturer claims that improved heat dissipation is accordingly afforded and silver reflective surfaces are physically protected resulting in greatly extended service life.

Although no radical innovations were developed in the 35mm exhibition optical field during 1957, increased lens speed through design revisions and employment of improved optical glass in their Prominar line was claimed by Kowa Optical Works of Nagoya.

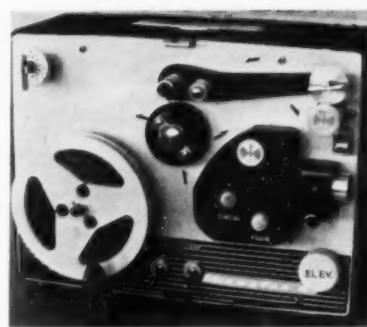
#### *Production Equipment*

In contrast to some previous years, a real spurt of development and manufacturing activity for professional production and laboratory processing equipment was noted during 1957. Spurred by controls which made foreign equipment nearly unattainable, the few professional camera and film processing equipment manufacturers unveiled some new designs. Displayed at the 3d Motion Picture Equipment Show by Seiki Seisakusho were their latest 35mm professional camera; quadra-head dubbing machine; and double-head continuous printer. At somewhat later dates, the Doi Co. introduced a 16mm professional camera, while Daiichi Seiki Co. announced their new ST-1200 16mm automatic daylight processing machine having 1200-ft/hr production capacity and automatic temperature control. Eikensha Co., producers of production and exhibition equipment accessories, developed a number of

interesting accessories including camera tripods; some beam-splitting lens for trick tiling and short-subject production work, and a professional "hot" splicer for both 35mm and 16mm film bonding.

In the camera optical field, Kowa Optical announced the Prominar Type 35-B anamorphic block-lens, available in 40mm and 50mm focal lengths, both of  $f/2.0$  (T2.3) speed, and a 75mm  $f/2.5$  (T2.8) for "widescope" camera aperture (22.05 by 18.67-mm) fitted with Mitchell BNC or NC mounts, but optionally available with mounts for Arriflex or Cameflex cameras. Keihan Optical of Sakai City, Osaka, countered with a competitive anamorphic taking lens, said to be available in focal lengths of 40mm, 50mm, 75mm and 100mm. Nippon Onkyo Seiki Co., Osaka, in a diversifying program since their establishment as an exhibition equipment supplier, announced the HyperRex anamorphic block-lens (including master lens) for use on Mitchell NC and other cameras employing Mitchell-type lens mounts. This company made preliminary announcement of a claimed revolutionary stereographic screen but details were not available in time for inclusion in this report.

Ryu Densha Co., prominent manufacturers of studio lighting equipment, announced and initiated deliveries of a triple carbon arclamp rated at 200-amp a-c. Designed for needs of Japanese and other Asian producing studios where near total absence of high-capacity d-c sources is the rule, this lamp was said to be developed from West German designs which employ two positive carbons in a V-mount and are spring-advanced. Limitation in domestic availability of larger carbon sizes is said to have dictated the design approach and this lamp employs two 13 by 305-mm positives together with one 11 by 233-mm negative, of either the "daylight" or "yellow flame" cored type. Filters are provided to achieve suitable lighting intensity and spectra suitable in Kelvin temperature for color film. Design of this lamp was carried out in conjunction with the research section of Matsushita Electric Industries, producers of a wide line of studio lighting and Kadomax projection arc carbons. This firm built two new factories during the year to increase monthly output to 700,000 pairs of all types. Dai Ichi Carbon Co. likewise increased plant and production facilities to a year-end capacity stated to be 600,000 units monthly. These included initial production during 1957 of 10- and 11-mm positive cored carbons to meet accelerated demands for rotating positive-type high-intensity carbons now coming into increasing favor with Japan's showcase houses.



**Fig. 76. New Star 8mm projector.**

#### *16mm and 8mm*

Shinkyo Electric Industrial Co., Tokyo, became the third Japanese 16mm sound projector manufacturer by introducing its model SU-1 projector in early 1957, supplementing comparable products previously available from only Elmo and Hokushin, as covered in last year's report. The SU-1 is designed to operate satisfactorily over an unusually wide range of input source voltages in realistic approach to meeting power variances in different Asian countries, and also is reversed in operating side from conventional design. Magnetic track reproduction accessories are said to be available to supplement the optical track sound built-in equipment.

Elmo Company of Nagoya scored another first by introduction of their Model XP-830 16mm sound projector with 500-w xenon lamp source, claimed to greatly increase screen projected lumens over the quantity obtainable from conventional 750-w incandescent projectors. The projector utilizes no shutter, according to the manufacturer, and light transmission efficiency should be high. The color temperature is claimed to be closely matched to daylight. It is claimed that the xenon discharge lamp is very easily and rapidly started and that flickerless projection is obtained. Unfortunately, no opportunity to witness the projector's performance was afforded in time for this report. The company announced continuing development of a 1-kw xenon lamp aimed at achieving projected brightness levels in excess of 2000 lm, but this did not materialize into a production model by year's end.

It was in the 8mm equipment field that greatest quantitative progress was registered with no less than nine additional brands of Japanese cameras and projectors introduced during 1957. These included the Comet S-2; 3-turret Clastone 8-T which includes one lens of  $f/1.0$  speed; the Crown 8-80; New Star 8 (Fig. 76); the Sankyo 8, which offers an accessory convenience of a pistol grip handle and trigger control (Fig. 77); and the Wansta 8 (single-lens) and 8P-1 double-turret model cameras. The



Fig. 77. Sankyo double-turret 8mm camera.



Fig. 78. Yashica double-turret 8mm camera.

Yashica 8 2-turret camera is said to be the lowest priced quality 8mm offered but it appears to be well made with features of wide range of speed adjustment including 8, 12, 15 (for kinescope filming), 16, 24, 32, 48 and 64 frames/sec exposure rates and a unique rangefinder graduated for both conventional and "Scope" image ratio composition (Fig. 78).

Kowa Optical Works announced their Kallo-8P projector late in the year. Although most manufacturers of 8mm cameras also produced a companion projector, the converse is not true for Kowa, who supply camera lenses to several other makers. The Alpen-8 projector has an interesting optional model featuring a built-in Sony  $\frac{1}{4}$ -in. magnetic tape recorder/reproducer mechanically interlocked to the projector drive for synchronization.

Elmo introduced their 8R-S (single) and 8R-T (triple-turret) cameras (Fig. 79) having unique electric-motor drive powered from four self-contained  $1\frac{1}{2}$ -v dry batteries claimed to have operating life sufficient for twenty 50-ft film roll



Fig. 79. Model 8R-T 8mm camera, Elmo Co.

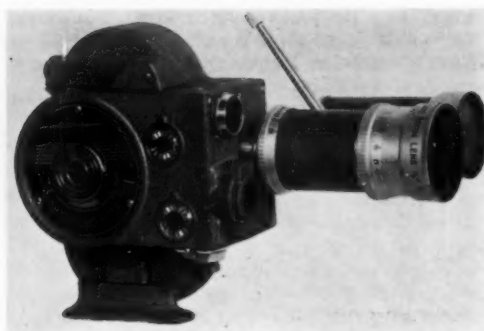


Fig. 80. Zoom lens on Cine Elmo 8-AA 8mm camera, Elmo Co.

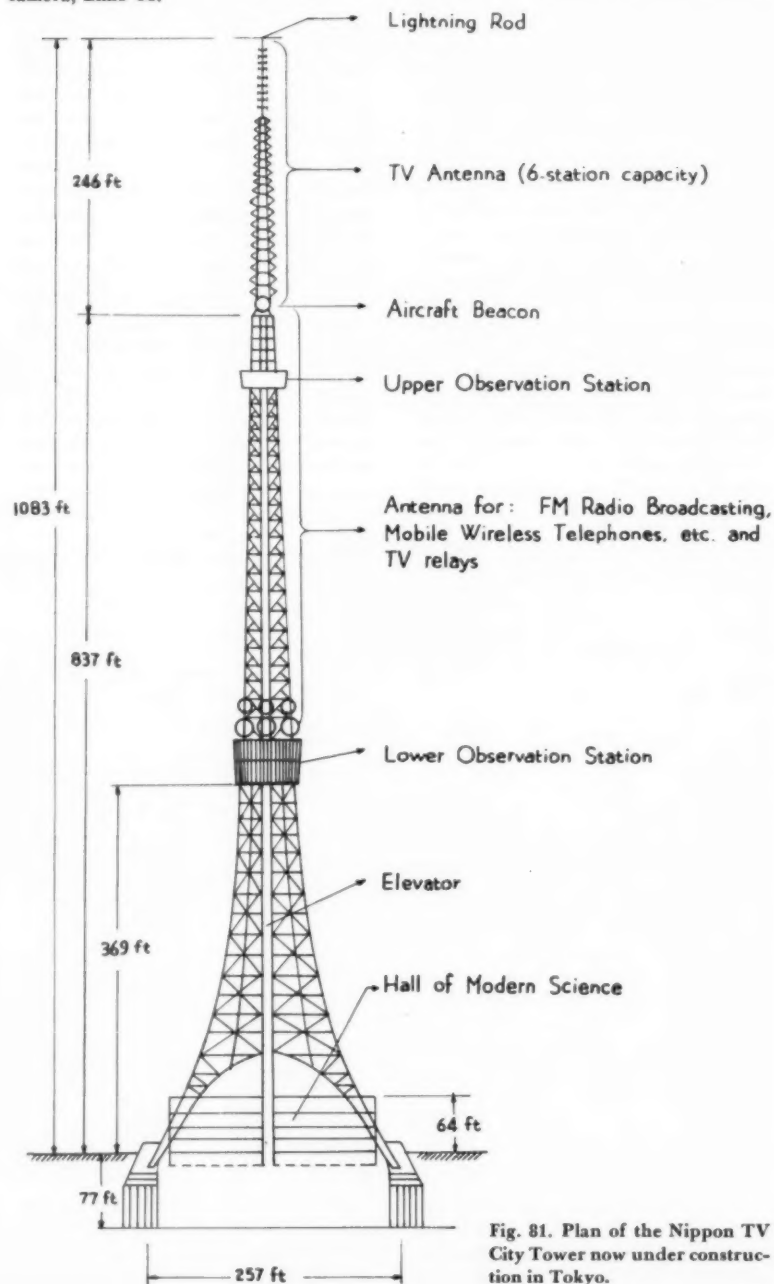


Fig. 81. Plan of the Nippon TV City Tower now under construction in Tokyo.

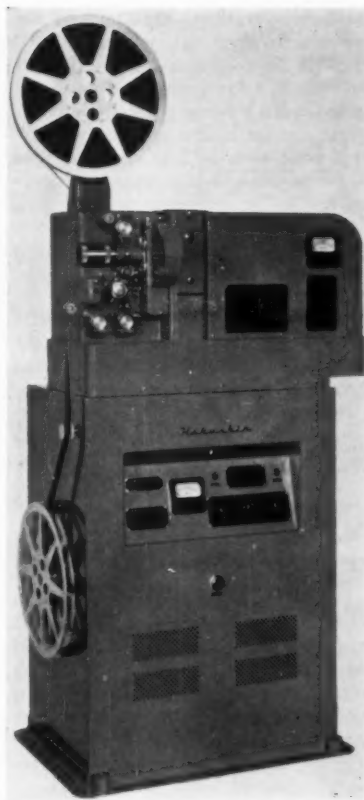


Fig. 82. The new Hokushin Model 2-3 16mm TV Projector.

exposure runs. The convenience afforded of eliminating spring-motor drive and rewinding requirements is somewhat offset by exposure rate limitations to only 16-frames, or single-frame options. Elmo also marketed an 8mm zoom lens within focal length range of  $\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. at  $f/2.8$  (Fig. 80).

The Walz Co. successfully negotiated international manufacturing rights to produce the well-known Norwood Director and Super-Director integrating exposure meters in their Japan plant, and their versions of these meters became available on Asian markets late in the year for both professional and amateur use.

#### Television

Typifying a pinnacle of success toward which this country's TV industry is surely building, construction was begun last July on the Nippon TV City Tower (Fig. 81). It will be the highest man-made structure in the world outside the U.S.A. The 1083-ft tower is designed in three main vertical sections: (1) a support base topped by a spacious lower observation station; (2) a middle section which has the upper observation tower at the top of the elevator service and which has the multiple parabolic antennae for microwave and FM broadcasting; and (3) the top section of TV antennae for six stations. The tower's four giant steel legs are set in concrete piers 77 ft into the earth. A basement and five-story building at the tower's base will house a Hall of Modern Science in three floors, a shopping center, restaurant and TV terminal and transmitter equipment. Already pledged to transmit from the tower are the government's NHK and two new commercial channels.

It is calculated that a 50-kw signal from the tower will serve a 62-mile radius, that 10-kw would embrace 49 miles and upwards of 14 million potential viewers.

In the initial boom of setting up new stations, designs of monochrome equipment were frozen for such as camera chains, monitors, switching controls and



Fig. 83. Microwave relay systems in Japan in December 1957, courtesy Nippon Telegraph and Telephone Public Corp.

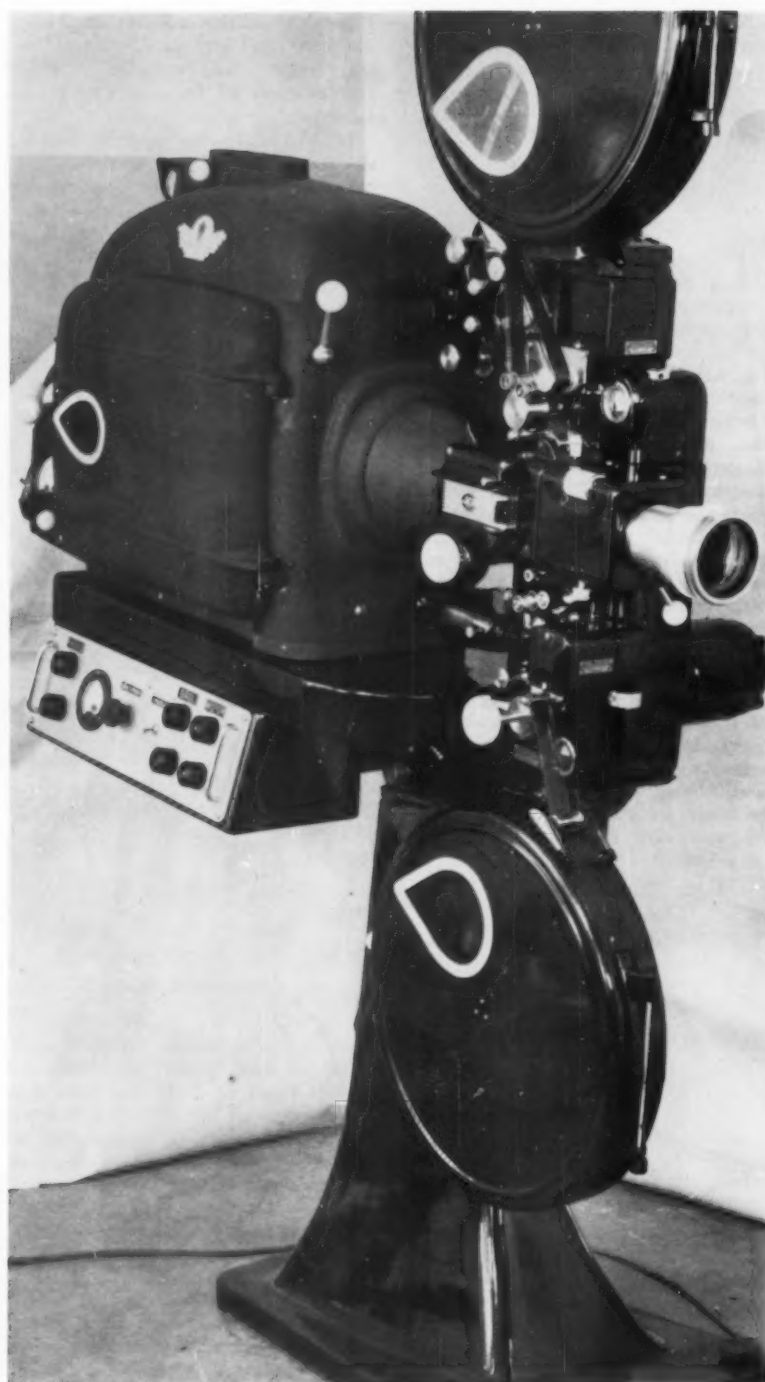


Fig. 84. AGA 35mm CS-projector for standard and wide-screen presentation, film threaded for magnetic sound.

transmitters. An exception has been the Hokusin Model 2-3 16mm TV projector (Fig. 82), believed the equal of any other such equipment in the world today.

It is interesting to note that in this most literate of the world's nations educational and cultural TV programs are given strong emphasis. About 30%

of air time of all TV outlets is given to educational programs. A Ministry of Postal Services spokesman has recorded the official recommendation that all licensees enhance cultural and educational values of potential programming without intrusion of commercials. The Ministry of Education is fully persuaded of the powerful value of television as an

ancillary educational medium and has announced plans to provide 40,000 receivers in schools and public institutions within a five-year period. Included in the list of TV licensees are a number of future stations classed as "educational" with more than 50% of their air time to be devoted to noncommercial purposes.

At the end of the year there were about 700,000 receivers in Japan, with about 40,000 being added monthly. A recent spurt is attributable to the appearance of a 14-in. TV receiver without brand name and selling for the equivalent of \$100 which is about half the cost of brand-name receivers.

Research in color TV receiver circuitry has been intensive, sparked by the RCA live color TV exhibit last May at the Japan International Trade Fair. Two Tokyo stations began color TV test broadcasting.

#### *TV Network Expansion*

Broadband 4,000-mc microwave radio relay systems for TV and message telephone use showed continued rapid expansion during 1957. The trunk microwave route reached Kagoshima at the south end of Japan — this and new branch routes are included in the map (Fig. 83). At the end of 1957 there were 12,400 channel miles (19,850 channel kilometers) of broadband facilities and 7,660 channel miles (12,260 channel kilometers) under construction.

At year's end there were these stations: in service, 13 noncommercial and 5 commercial; licensed by the Ministry of Postal Services, 13 noncommercial and 40 commercial. So, in the near future there will be about 70 TV stations, including 11 VHF.

To meet the extensive requirements of many independent stations for program exchange, the following are provided: (1) specially designed program switching facilities in control microwave stations; (2) 4,000-mc main routes; (3) short-haul TV links for intra-city TV networks and video drops from repeater stations; and (4) for short-haul transmission either paired video cable systems or 6,000-mc radio links.<sup>20</sup>

#### **Mexico**

For this initial report from Mexico it was difficult to obtain concrete information for most areas.

In Mexico City there are now three TV channels. Equipment in the studios and transmitters has been drawn from all or most of the U.S. companies. Although there are many half-hour shows, a large part of the programming is "live."

Cinecolor Laboratories of Mexico inaugurated operations with Debie equipment in November 1957. The automatic developer unit takes negative on one side and positive on the other. Copying of prints is by the additive method. This



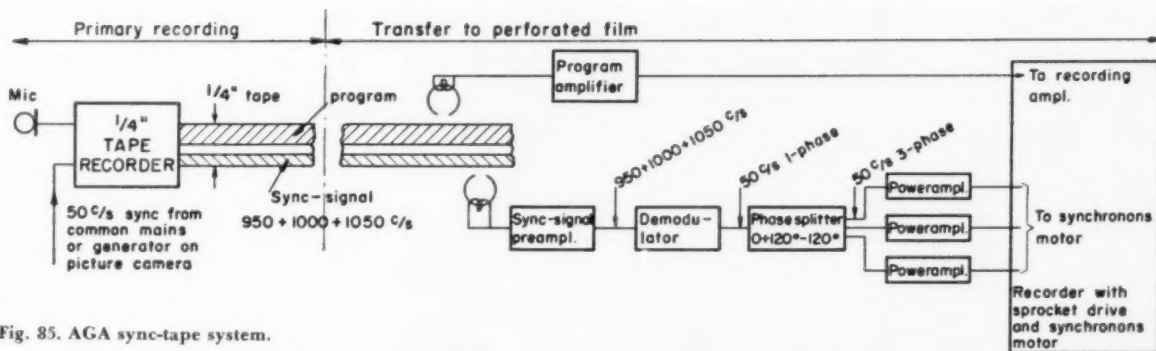


Fig. 85. AGA sync-tape system.

laboratory handles exclusively Eastman Color Negatives. The printer is of a new design which permits centering of the projection lamp from outside with minimum effort and maximum exactness.

Work is being expedited to install color equipment also at the Churubusco Studios and at San Angel Studios.<sup>271</sup>

The building of theaters continued in Mexico, with one circuit building 12 new ones.<sup>272</sup> A number of theaters were damaged in the earthquake but most have been repaired.<sup>273</sup>

#### Sweden

This is the first report from Sweden, so statistics for motion pictures and television are included.

Sweden has a population of 7.3 millions. This population buys 70 million tickets a year at a sales cost of 170,000,000 Swedish crowns (20¢ at official U.S. exchange) of which 60,000,000 crowns in taxes is collected by state and county. Thus, 38% of the ticket fee is taxed away, but some pictures are tax exempt.

There are 600 motion-picture theaters exhibiting daily one or more shows; 1,800 theaters exhibit six or less days a week. There are 1,000 theaters equipped for CinemaScope release, and of these 50 can reproduce multichannel magnetic sound.

Swedish film producers released 34 features last year. There were imported 310 features, of which 180 came from U.S.A.

Television, a state monopoly like audio broadcasting, was initiated last year; there are three transmitters covering 25% of the population, and 100,000 TV sets have been sold.

Sweden is rather open to importation of equipment, the duty being only 15% (compared with 40% in U.S.A. and 65% in Australia). The low duty and the limited population explain why there is only one major manufacturer concerned with a broad line of professional motion-picture equipment comprised of projectors, amplifiers, speakers, cameras, magnetic recorders, mixing equipment, anamorphic lenses, etc., for studio uses.

A new 35mm projector has been marketed by Svenska Aktiebolaget Gasac-cumulator (AGA) (Fig. 84), with new de-

sign features of a gear train of only cylindrical gears, air and water cooling, automatic loop formers, constant loop forming, lubrication by filtered oil circulation, optical and magnetic soundheads with double roller speed equalization (Davis drive). Other features are: improved focusing with adequate control gear and lens holders on ball bearings for wide-screen projecting, curved film gate, improved aperture plates for easier changing of ratios, faster electrical changeover, pushbutton operation and remote control of lamp and motor. Magnetic sound reproduction, like optical, is controlled by the upper sprocket driven by the gear train and not by the perforated film, to insure wow-free operation of the magnetic soundhead.

AGA's magnetic recorder has been improved by the addition of soundhead units which are prealigned for ease of exchange, and have recently been used for 35mm film with basic, standard perforation and two magnetic strips in No. 1 and No. 3 positions. This is a compatible print which gives the improved sound quality of single-channel magnetic sound, and the possibility of dual- or triple-language release.

Mixing equipment has been designed for 19-in. rack mounting, with units which can be added as the need develops. There are units for optical and for magnetic sound, film drive with forward, reverse, sync and nonsync speed, remote control, intercom, etc.

AGA has a complete system for synchronization of  $\frac{1}{4}$ -in. tape on a straightforward principle without comparison and servo feedback. Wow and flutter are reported not to exceed 0.1% and the system has been described as easy to operate. The sync signal is 1,000-c modulated by 50 c (or by equivalent signal from picture camera) and recorded on one side of the tape. No measurable 1,000-c signal appears on the program carrying part of the tape, as magnetic stray field and crosstalk decrease considerably with decreasing recorded wavelength. Having its own area the sync signal cannot be destroyed by overloading from program signals. The system has also been used on lightweight equipment with a 25-c sync-carrier and single recording head. All  $\frac{1}{4}$ -in.

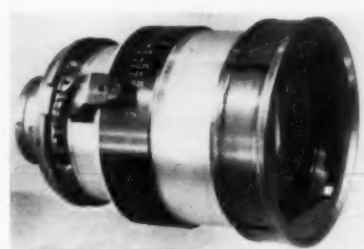


Fig. 86. AGAScope anamorphic camera lens system f 46/23 f:2.

material is transferred to 35mm perforated magnetic film for usual handling in the studio. The system is explained by the block diagram (Fig. 85).

A rather complete line of 2:1 cylindrical camera anamorphics has been designed by AGA, including the backing lens and the anamorphic part in one unit with a single focusing control. Focusing and iris controls can be readily connected to control knobs outside the blimp. The Agascope anamorphic camera lens systems have been designed for focal lengths of 46/23, 75/37.5 and 105/52.5. These designs are based on new calculation methods which together with highly developed grinding and manufacturing methods have been reported to yield excellent resolving power (Fig. 86).

Color film used in Sweden is Eastman Color Negative and Color Positive. It is standard practice to cut a 10-frame negative from all scenes for quick evaluation of printer light. These 10 frames are printed simultaneously through 10 different filters and are then projected through a still projector to facilitate correct grading. Equipment for daylight developing and printing has been introduced by Laboratory AB Filmteknik, Solna.

The EIA Royal 16mm sound motion-picture projector has been put on the domestic and foreign markets. It works on a-c only and the mains transformers have wiring for 10-v 10-amp for the high-intensity lamp to give 110 lux on a 120-cm wide screen. A pushbutton automatic lamp changer is provided. Light for sound scanning is taken from the same lamp, and due to the heavy filament wire a low amount of hum obtains. From the

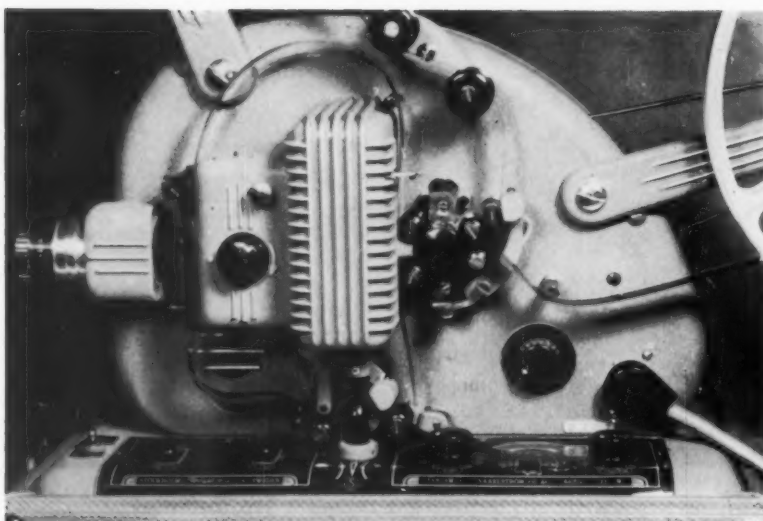


Fig. 87. EIA Royal 16mm sound motion-picture projector.

constant-speed motor with 2,800 rpm, two speeds, 18- and 24-frames/sec, are derived with belt pulleys. The motor drives the cooling fan directly. The film transport has a 10-sprocket wheel and a 2-sprocket shuttle with a switching lapse of 1/192 sec. The amplifier's output is 8 w. The projector with case and loud-speaker in the cover weighs 48½ lb. (Fig. 87).<sup>174</sup>

#### U.S.S.R.

(It is hoped that next year we shall have another report direct from Russia and that it will include a first-hand report on television.)

Mosfilm is the largest of the twenty-odd film studios producing feature film in the Soviet Union. For its scope of production, Mosfilm has won a place among the biggest enterprises of its kind in the world. In 1957 Mosfilm made 22 films or nearly one-fourth the total number of full-length feature films produced in the Soviet Union. It is expected that this Studio will soon be making up to 40 feature films a year.

Mosfilm's production includes films for cinema theaters and for television. Recently several have been made each year in wide-screen or CinemaScope process with stereophonic sound.

Mosfilm is located in the southeastern part of the capital with Moscow State University's many-storeyed building its nearest neighbor. The Studios are constantly being expanded. They are housed in several substantial buildings, the scaffolding only recently having been removed from some of the fine buildings which stand beside the massive old building which was built before 1930. One of these is the new studio building shown in Fig. 88. A new sound recording studio building equipped for stereophonic recording is already in use.

There is a fine orchard on the studio grounds, planted and cultivated by A.P. Dovzhenko; there is also a conservatory where flowers are raised. Situated away from the noisy city thoroughfares, the Studios offer excellent grounds for outdoor settings. Up to 30% of all location shots are made here. This permits a tre-

mendous saving in time which would otherwise be spent on trips or filming expeditions (Fig. 89).

The new Mosfilm Studios also boast construction with sound-proof overhead facilities, walls muffled with special fabric, lifts and repositories for sets and props, and many other devices to create the most favorable working conditions.

Like all Soviet film studios the Mosfilm combines production and creative work: filming, direction and screenplay preparation being combined with the highly developed technology for production. There is a single and uninterrupted process, from the preparation of the original script, the selection of filming groups, to the shooting and editing of the film.

(Here, it should be noted, the editing of this report has required excision of considerable information about Soviet directors, actors and numerous and widely varying films in production. An example of an indoor setting is given in Fig. 90.)

To aid the film director and art director, especially of historical films, Mosfilm has set up a large information and methods department offering extensive bibliographical and iconographical material.

These Studios employ a huge personnel engaged in over a hundred professions. Essential aid in accelerating the assembling and dismantling of sets is provided by the architectural bureau. Here personnel are engaged in simplifying the process of creating art settings, and designing panels of the proper size for making all types of structures, from architecturally intricate palaces and castles to the simplest premises. Special means for rapidly assembling and finishing floors and walls have been developed. Imitations of various buildings and decorative materials such as parquette, stucco, moulding, expensive types of wood, etc., are used extensively.

Because not everything can be, or needs to be, reproduced, Mosfilm often resorts to trick shots to achieve apparent reality or special effects. Multi-story buildings and even panoramas of entire



Fig. 88. Lenin's Order Kino Studio of Mosfilm.



Fig. 89. Titles and backgrounds are filmed here.

Fig. 90. Producer Roshov in living-room set for A. Tolstoy's "Road to Calvary."

cities, and sometimes aircraft, trains and ships are filmed with the aid of small models (Fig. 91).

Also of great importance is the achievement of sound effects. Castanets, a small wooden ring and several bells may produce the effect of an entire troika. And a bathtub of water along with a chute filled with some loose material tossing about on the surface convincingly reproduces the sound of surf breakers (Fig. 92).

Diverse functions often are given equally important and careful attention, for instance: the make-up shop (Fig. 93) and the camera technique laboratory (Fig. 94) which checks and tests lenses, makes filters of all kinds for color filming, and designs new apparatus and instruments as well as develops new techniques in cinematography.

The Soviet cinema industry is putting out more films from year to year and the quality of the pictures is also on the upgrade.<sup>275</sup>

Russia has been working on a wide-screen process similar to Cinerama, the first production of which opened early in 1958 in Moscow.<sup>276</sup> The process was announced about a year earlier.<sup>277</sup> The first production was a color travelogue, *How Broad Is My Country*. It was first

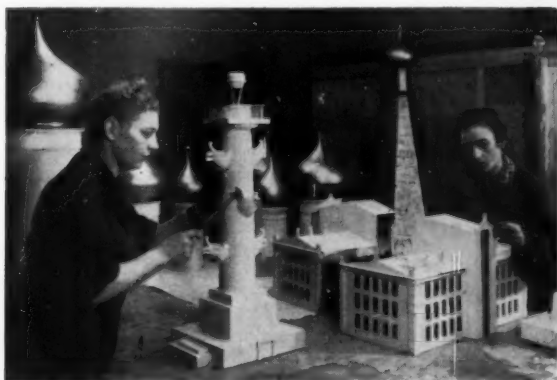


Fig. 91. Scenery laboratory for film of A. Tolstoy's "Road to Calvary."



Fig. 92. Sound studio, Mosfilm. Producer Maychek and Director Morosov making sea-wave sounds.



Fig. 93. Makeup shop.

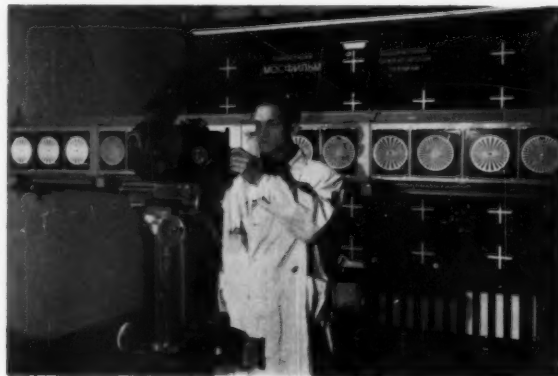


Fig. 94. Laboratory for cinematography.



Fig. 95. Editing department, Bolivar Films.



Fig. 96. Sound Department, Bolivar Films.

shown in Moscow's Mir Theatre which has 1,226 seats. The screen size was 101.7 by 37.7 ft, and 120 loudspeakers were used. Irving R. Levine reported it the best Russian travelogue ever made and suggested that it be made an exchange film with U.S.A.

A new 3-D theater was opened in Kiev, employing six projectors, two soundtracks and 30 clusters of loudspeakers.<sup>278</sup>

A camera which takes 32,000 photographs a second was built in the Soviet Union.<sup>279</sup> A method of shortening the processing time of color reversal film was described.<sup>280</sup>

Reports about television, though meager, indicate that the Soviet Union is working very hard on color TV and that some 30 new stations are expected to carry color TV in 1958.<sup>281</sup> In mid-1957 it was reported that Russia had eight large TV stations in operation.<sup>282</sup> *Electronics* magazine reported the development in Russia of a camera for underwater work on ships, bridges, harbor installations and for biological and zoological purposes.<sup>283</sup>

#### Venezuela

The motion-picture industry has grown greatly in the last few years, even though it does not enjoy direct government subsidies or high protective tariffs. Exhibitors show films from U.S.A., Great Britain and Europe. The production of feature films is not a good prospect because production costs for film services are high and there are few specialists and technicians available. Thanks to television broadcast activity, there is now forming a nucleus of specialized personnel.

There is substantial activity in commercial cartoons and in documentary films and other films for public relations and sales promotion. Few, if any, documentaries are produced for exhibition abroad.

There are about a dozen small studios and independent producers and three large local companies: Bolivar Films, Tiuna Films and Telefilms. Telefilms is a

subsidiary of the Radio Caracas TV and works exclusively in 16mm.

Bolivar Films has been established for 17 years and has the most complete film library in Venezuela — with many historic scenes such as the personal presentation of Juan Vicente Gomez, President of Venezuela for many years, and continuing on through the most recent events. Bolivar Films has produced about a dozen full-length features. Bolivar produces a weekly newsreel, documentary films in black-and-white and color, cartoons and propaganda films for theaters and television (Fig. 95).

Bolivar Films is Venezuela's fullest equipped producer, having five studios — but recently only one of them was in use. Bolivar's laboratories process Eastman Color films and monochrome in 16mm and 35mm with reduction facilities. The firm has a large sound department (Fig. 96), and also substantial camera, editing and animation departments.

Tiuna Films has specialized in producing propaganda or information films in both monochrome and color for TV and theaters. The firm produces two

newsreels weekly in 35mm and one daily TV newsreel. It produced one full-length feature in 1957, filmed with anamorphic Totalscope lens and Eastman Color. Two full features are planned for 1958. Tiuna has its own laboratory for black-and-white 35mm and 16mm; magnetic and optical sound recording; screening room equipped with double-track projectors; an editing department, animation department, complete camera equipment and the Totalscope anamorphic system.

One of the two independent laboratories, very small by U.S.A. standards, is that of Gama Films which processes 16mm and 35mm and has projection and editing facilities and a film library. Gama started processing Eastman Color in January 1958 (Fig. 97). Gama also has an animation department, using a Debie 35mm camera. Several cartoonists are employed to produce sales promotion films in monochrome and color.

The other independent laboratory is Caribe Films which has just installed a new color processor, D.U.C. 20 Type N by Andre Debie (France). Caribe processes 35mm and 16mm and has review

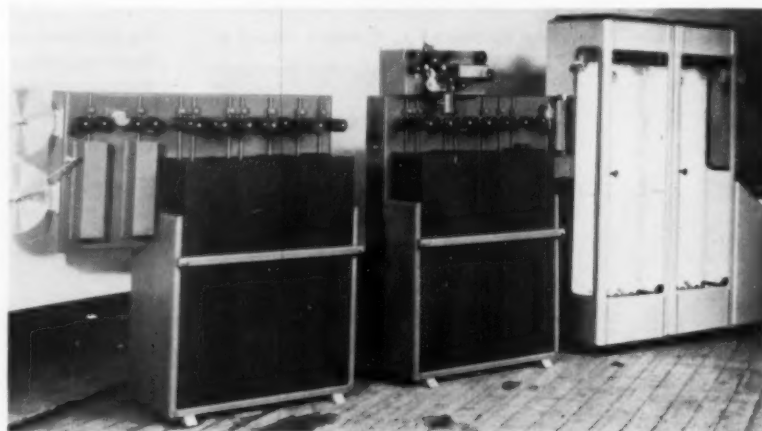


Fig. 97. Color film developing machines at Gama Films Laboratories, by Kinotechniek of Amsterdam, Holland.



room and editing facilities and a film library.

One of the independent producers in Venezuela is I.V.N.I.C., the Venezuelan Institute for Brain Research. It owns a complete film production unit (Fig. 98).

#### Television

Venezuela has four stations, three in Caracas and one in Maracaibo. A second station in Maracaibo and one in Valencia will begin operation by mid-1958. Television has grown constantly in popularity and is particularly favored in the interior.

Radio Caracas TV originates programs at its principal station which is in Caracas. A network of six relay transmitters gives this station, Channel 2, a potential of 1,000,000 viewers. Its studio equipment includes a mobile remote pickup unit, two film chains, three 16mm projectors, two projectors for 35mm slides, and two 4 by 5 opaque image projectors.

Televisa (Channels 4, 9 and 11) has

Marconi equipment from England, including ten Marconi cameras using British and German orthicons. There are two studios at the station and one in the city. Televisa has a Marconi mobile remote pickup unit equipped with three cameras, using two microwave systems, one by Marconi and one by Raytheon. This system has three relay transmitters in operation and four more under construction.

The Televisora Nacional (Channel 5) is Government property and was the first television station in Venezuela. It has RCA equipment of 5-kw and a three-element antenna. Its studio and equipment are all in one building from which it transmits daily and ties into the networks of other stations to transmit official news and ceremonies. It usually transmits only cultural and educational programs.

There is also Televisa del Zulia, a subsidiary of Televisa Caracas, which covers all of Zulia state with a home-made 1-kw transmitter.<sup>284</sup>



Fig. 98. NC Mitchell Camera used to produce scientific films at IVNIC (Venezuelan Institute of Brain Research).

### EDUCATIONAL MOTION PICTURES AND TELEVISION

During 1957, in the United States there was spent on nontheatrical films — for film productions, release prints, film distribution, projection equipment and other audio-visual equipment and material — an estimated \$257,000,000 (Fig. 99). This is \$20,890,000 over earlier predictions<sup>285</sup> due to increased estimates for governmental (Federal, state and local) expenditures, from \$31 million to \$49 million; and for education, from \$22 million to \$25 million. The other portions of the original estimate remain at: business and industry, \$156 million; religion, \$13.9 million; civics, social welfare and recreation, \$7.5 million; and medicine and miscellaneous, \$5.6 million.

In addition to the above, salaries of \$75 million are estimated on the basis of a survey of 11,000 part- and full-time workers. These are exclusive of salaries paid to personnel in commercial production companies, laboratories, distributors and dealers, which are included in the overall total of \$257 million.

A total of 36,000 16mm sound projectors were purchased for domestic use, or by the Federal Government for use outside the United States. Approximately 536,000 16mm sound projectors are in operation in the United States. Schools and colleges have 171,000; business and industry, 159,300; churches and synagogues, 90,000; government agencies, 65,100; civic, social welfare and recreational organizations, 42,500; and medicine and miscellaneous, 7,900 (Fig. 100).

Since 1946, a total of 90,350 16mm sound projectors have been exported. This figure does not include machines manufactured or assembled by Ameri-

can-owned plants in foreign countries. In 1957, 7,165 projectors were sold in the export market.<sup>286</sup>

Significant book, *Graphic Communication and the Crisis in Education*, was published by the Dept. of Audio Visual Instruction, National Education Assn. Written by Dr. Neal Miller of Yale University in collaboration with a group of psychologists and graphic communication specialists, it describes the obstacles to best use of film. The theory of learning through both the eye and the ear is set forth and the use of films to augment motivation is stressed.

The Film Council of America closed its doors in October, bringing to an end a 10-year promotion program, largely supported within recent years by the Ford Foundation Fund for Adult Education.<sup>287</sup>

A one-day workshop for sales and advertising people was held May 23 by Rudy Swanson Productions at Appleton, Wis. Although following a different pattern, the workshop was inspired by the world-famous workshop held annually for the last 12 years on the soundstages of The Calvin Co., Kansas City, Mo.

A new magazine, *Film Media*, appeared in June 1957. It is affiliated with *Industrial Photography*.

Articles on the nontheatrical field were published in *Newsweek*, *Time*, *News Front*, *New York Times*, *Readers Digest* and other national publications.<sup>288</sup>

A large studio was constructed in New Jersey for the Boy Scouts of America was donated by the late Thomas J. Watson. The National Film Board of Canada dedicated its fine new facilities at Montreal.

The first Industrial Audio Visual Exhibition was held in New York, November 13-15, sponsored by the National Visual Presentation Assn. and attended by 3000 persons.

A number of firms throughout the country show motion pictures during lunch hours in cafeterias, in auditoriums and in some work areas. Special programs are offered by national distributors.

A second and revised edition of *The Check List for Producer and Sponsor Responsibilities*, published in 1948 by the

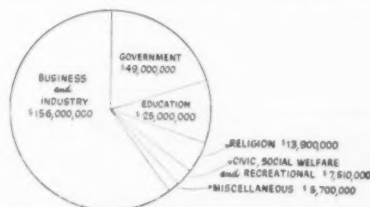


Fig. 99. Revised estimate of distribution of funds spent annually in the United States in audio-visual field; total 1957 estimate, \$257,000,000.

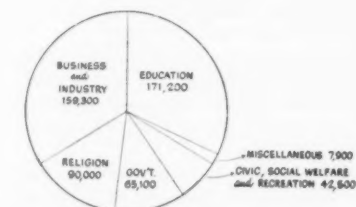


Fig. 100. Distribution of 16mm sound projectors in the United States. Estimated total of 536,000.

Assn. of National Advertisers, New York, was published in July and renamed *Responsibilities of the Film Producer and Sponsor*.

The world's first business film festival was held in Harrogate, England, October 8-12. Eleven motion pictures, selected to represent United States productions, were later exhibited in Rochester, N.Y., November 19, which was designated Rochester Business Film Day.

After completing its film series on physics, Encyclopedia Britannica Films began production of 160 half-hour films for high-school chemistry classes in September 1958.<sup>289</sup> The series is being photographed at the University of Florida under the direction of John F. Baxter. Although the physics series was filmed while it was being televised, the chemistry series is being produced strictly as a film operation.

Producers of educational films have indicated that the trend is toward black-and-white prints, away from color, and to lengths of 10 to 15 min.

There is a steady increase in the number of universities and colleges offering motion-picture and audio-visual courses. An article in *Phi Delta Kappan*,<sup>290</sup> describes the Audio-Visual Center at Indiana University. An independent non-profit organization, Audio-Visual Commission on Public Information, 250 W. 57 St., New York, was formed to promote the use of films in the educational field. It has published five booklets and a set of color slides for use by audio-visual educators.

Religious films are reported to be distributed more and more by denominational bookstores and film libraries rather than by commercial distributors.

The U.S. Dept. of Agriculture held its fifth Audio-Visual Workshop in Washington, D.C. The workshop, primarily for extension personnel, has had a wide influence on audio-visual applications.

The Calvin Co. conducted its annual workshop and gave it over entirely to medical motion-picture production. In June, the American Medical Association and Johnson & Johnson Co. cosponsored an exhibition of medical films in New York.

#### Educational TV

The field of educational TV is growing so rapidly that it is impossible to cover all developments. A few highlights are described in this section.

There are three main types of educational TV: closed circuit; stations sponsored by educational groups; and commercial stations offering educational programs.

An interesting closed-circuit TV project is that in the Chelsea Park district of New York, linking 600 apartments to classrooms of the nearest public school.<sup>291</sup> Programs originate within the school or the area's neighborhood house. Formerly

known as Hell's Kitchen, the district is now largely populated by non-English-speaking groups.

A few of the educational institutions using closed-circuit TV as a teaching method are: Pennsylvania State University, Stephens College at Columbia, Mo.; University of Minnesota; and Evanston Township High School.<sup>292</sup> The extensive experimental program at Hagerstown in Washington County, Md., was noted earlier in this report and was well covered in a *Journal* paper.<sup>185</sup> All the schools in the county will eventually be linked to the system and numerous courses are now being given over the closed-circuit system.

New York State Dept. of Education is testing closed-circuit television at Teachers Colleges at Brockport and Albany, and at the Union Free District No. 5 at Levittown, L.I. At Miami University, Oxford, Ohio, more than 3000 freshmen and sophomores are receiving closed-circuit TV instruction in various courses.<sup>293</sup> Tests comparing the learning level of large and small groups are being made. Fisk University, Nashville, Tenn., uses closed-circuit primarily in courses with a large enrollment, or in multi-section classes. Meharry Medical College, near Fisk University, has been linked to this system.<sup>294</sup> Many other educational institutions are using closed-circuit TV as a teaching medium.

Six new educationally sponsored TV stations went on the air in 1957: WAIQ, Andalusia, Ala.; WYES-TV, New Orleans, La.; KTCA-TV, Minneapolis-St. Paul, Minn.; WHYY-TV, Philadelphia, Pa.; KOAC-TV, Corvallis, Ore.; WMVS-TV, Milwaukee, Wis. It has been predicted that 20 stations will begin operations in 1958.

Commercial TV stations are stepping up the number of educational programs on their channels. Many local stations in cities having universities and colleges offer frequent educational programs. For example, the University of Rochester offers two weekly programs, one of which is from the Eastman School of Music. The programs have local public-service sponsorship.

Among industrial applications is that of making simultaneous sales presentations to a firm's branch or division offices.

Educational television has been called a revolutionary development in the American educational system.<sup>294</sup> Clarence H. Faust, President of the Fund for Advancement of Education, Ford Foundation, stated that educational TV may "do a great deal to raise salary ceilings for teachers and to elevate the status of the teaching profession." He emphasized that "quality must be, above all, our concern."<sup>295</sup>

Educational TV has been used for some years in military training programs. Joseph H. Kanner, in a recent review of the experience of the Army Pictorial

Service Division, debunks the "cureall" concept of educational TV. The medium does not automatically take the place of good teaching, but rather requires completely new teaching techniques. Excellent classroom teachers do not necessarily become first-rate TV teachers. Special training and testing of techniques are required.

An informative booklet which can be highly recommended is *Television in Education*, published by the Office of Education, U. S. Dept. of Health, Education and Welfare.

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## Conclusion

Your Chairman extends his thanks to all those who have contributed to this report. It is hoped that contributors who are not Committee Members are identified throughout. The Committee Members who have written the material in this report are particularly to be thanked; in the overall presentation the extensive contributions of many of our Committee are not identified. We hope that a large number of readers will find much of interest here in both technical and geographic areas.

## Letters to the Editor Television Receiver Picture-Area Losses

With reference to the excellent article "Television Receiver Picture-Area Losses" in the December 1957 issue of the *Journal*, I was interested to find that Mr. Townsend's results are close to those obtained by Du Mont in a similar series of tests made in 1947. The tests were conducted by Otis Freeman, now Chief Engineer at WPIX, and were reported, as I recall, in "Television" magazine. As a result of the tests, the following standard practice was made a part of the Du Mont Television Network's "Engineering Standards Handbook":

"A test made in the New York area showed that with an 8½% margin between the vital information and the top and bottom edges of the transmitted picture, 96% of the receivers sampled showed the vital information; and that with a 13% margin between the vital information and the right and left edges of the transmitted picture, 95% of the receivers sampled showed the vital information.

"All studio monitors shall be marked with lines to indicate full raster size and 10% margins on either side and at the top and bottom. Engineering personnel will advise program personnel to keep important program material within these limits."

January 7, 1958 RODNEY D. CHIPP, P.E.,  
Manager, Systems Engineering,  
Radio Communication Laboratory,  
Federal Telecommunication Laboratories,  
500 Washington Ave.,  
Nutley 10, N.J.

From Otis Freeman

Mr. Charles L. Townsend's report of the test at NBC to determine the amount of transmitted picture lost behind the mask of a television receiver reminds me of a similar test that I conducted in 1947, the results of which were published in the March 1948 issue of "Television" magazine.

Based on more than fifty replies to an on-the-air appeal for viewers to give letters or numbers seen at the edges of their television screens, I found that if essential information were kept away from an 8.5% margin top and bottom and a 13% margin left and right, it would show on 95% of the receivers.

Since 1947 many things about television receivers have changed, not the least of which is the shape of the mask.

February 6, 1958

OTIS FREEMAN, Chief Engineer,  
WPIX, Inc.,  
220 East 42 St., New York 17



**Pierre Mertz** retired from Bell Telephone Laboratories on May 1, after 33 years with the Bell System. During those years, much of his work was in the field of transmission problems relating to telephotography and television. He has also acted as general consultant on broadband transmission systems, data transmission, pulse transmission and visual and optical problems in microrecord information service.

He joined the American Telephone and Telegraph Co. in 1919, shortly after being graduated from Cornell University. He returned to Cornell in 1922 for graduate work and in 1926 was granted the PhD degree. He then returned to the Research and Development Dept. of A.T.&T., which later became part of Bell Telephone Laboratories.

During World War II, he worked on several projects for the NDRC and the Technical Industrial Intelligence Committee and was awarded two Army-Navy Certificates of Appreciation.

He is a Fellow of this Society and Chairman of its Board of Editors since 1955. He holds membership in several other professional organizations, including the Institute of Radio Engineers, of which he is a Fellow. He is a member of American Physical Society, Inter-Society Color Council, American Ordnance Assn. and Optical Society of America.

A member of the Kiwanis Club of New York City, Mr. Mertz served on its Board of Directors for several years. He is also active in civic affairs in Lido Beach, Long Island, where he makes his home.

**SMPTE President Barton Kreuzer** has been appointed Manager of Marketing for the newly created Astro-Electronics Products Div. of Radio Corp. of America. The new division will develop and produce satellites, space vehicles and associated electronic equipment. Research headquarters will be in facilities located about five miles east of the David Sarnoff Research Center, Princeton, N.J., from which a number of distinguished scientists and engineers have been recruited. Arthur W. Vance is Chief Engineer for the new division and Carl W. Zemke is Manager of Operations Control.



## Papers for the 84th Convention, October 20-24, Hotel Sheraton-Cadillac, Detroit

*Films and Television in Industry and Education* is the theme.

The Society's Papers Committee has been planning for the past six months to meet certain timely and regional demands. Regional Papers Committee Chairman, C. E. Heppberger, becomes Chairman of the Program, working under Papers Committee Chairman Ben Plakun and in close cooperation with Editorial Vice-President Glenn Matthews. They have "taken time by the forelock" and gotten an early start toward a successful program, with a number of excellent papers and at least one industry seminar session already lined up.

The topics represent a diversity of fields, related in various ways to the theme of the Program. Each of the Topic Chairmen, listed below, is endeavoring to obtain as many good papers as possible for a session or sessions on his topic but no paper of interest to the Society will be ignored or excluded from the program because of doubt as to its exact topic category. If you know of a subject or prospect for a good paper and are uncertain about relating the subject matter to any of the topics given below, write directly to the Editor at Society Headquarters or, preferably, to:

**C. E. Heppberger**, SMPTE Program Chairman,  
510 White Oak Dr., Naperville, Ill.,

or to:

**Harold W. Kinzle**, Associate Program Chairman,  
1345 Argyle St., Chicago 40.

*Topics and Topic Chairmen are:*

**Color Photography:** JOHN P. BREEDEN, JR., Ford Motor Co., Film Services Sec., American Rd., Dearborn, Mich.

**Instrumentation and High-Speed Photography:** RICHARD O. PAINTER, Exp. Eng. Dept., General Motors Proving Ground, Milford, Mich.

**Laboratory Practices:** PHILIP E. SMITH, Kodak Processing Lab., 1712 Prairie Ave., Chicago 16.

**Nontheatrical Production and Techniques, Industrial Phase:** JOHN FLORY, Advisor on Nontheatrical Films, Eastman Kodak Co., 343 State St., Rochester 4, N.Y.

—, **University Phase,** O. STEPHAN KNUDSEN, Iowa State College, Alice Norton House, Ames, Iowa.

**Sound Recording and Reproduction:** GORDON L. ELLSWORTH, General Motors Photographic, 465 W. Milwaukee Ave., Detroit 2.

**Standards and Standardization:** A. C. ROBERTSON, Eastman Kodak Co., Kodak Park, Bldg. 35, Rochester 4, N.Y.

**Studio Lighting and Practices:** DENNIS GILLSON, National Film Board, Box 6100, Montreal 3, Quebec.

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- INTERNEGATIVES 16MM (7270) FROM 16MM KODACHROMES
- BLOW-UPS FROM 16MM KODACHROME TO 35MM COLOR
- KODACHROME SCENE TO SCENE COLOR BALANCED PRINTING
- 35MM COLOR FILM STRIP PRINTING



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### Television — Concepts and Practices:

——, **Commercial and Industrial**, EDGAR J. LOVE, WWJ-TV, 622 W. Lafayette St., Detroit 31.

——, **Educational**, ALLAN M. DELAND, Educational TV and Radio Center, 2320 Washtenaw Ave., Ann Arbor, Mich.

——, **Film Techniques**, RODGER J. ROSS, Canadian Broadcasting Corp., 354 Jarvis St., Toronto, Canada.

——, **International Television and Multilingual Films**, E. W. D'ARCY, D'Arcy and Associates, P.O. Box 1103, Ogden Dunes, Gary, Ind.

**Theater-Projection Practices**: FRANK H. RIFFLE, 110 N. Hubbard Lane, Louisville 7, Ky.

**16mm Color Intermediate Negative/Positive, a seminar**, is under the guidance of Robert A. Colburn, Geo W. Colburn Laboratories, 164 N. Wacker Dr., Chicago 6. The session will be open to all interested persons.

*Regional Chairmen of the Papers Committee* work for each and every Convention Program, in contrast to the

84th Program Topic Chairmen listed above. The Regional Chairmen are listed on p. 9 of the April *Journal*, Part II. A few are being added and so a supplementary list will be published next month. Author forms may be obtained from any of these chairmen.

*Deadline for abstracts* is August 4. In other words the abstract **MUST** reach the Program Chairman on or before that date and a reading copy of the paper **MUST** reach him on or before September 22. (A reading copy may consist of oral delivery drafts, or manuscripts subject to later revision. A final manuscript together with illustrations is, of course, preferable.) Abstracts submitted after the deadlines will be considered but cannot be scheduled without special permission of the Program Chairman and Papers Committee Chairman.

### Equipment Exhibit

During the recent Los Angeles Convention, the decision was made to hold an Equipment Exhibit at the Detroit Convention. Ken Mason will head up the planning from his office at Eastman Kodak Co., Prudential Bldg., Rm. 2006, Chicago 24.—R.H.

### Education, Industry News

Two courses in motion pictures and three in television-radio are offered by the University of Calif., Los Angeles, for the Summer Session, June 23—August 2. The motion-picture courses are: Introduction to Motion Pictures, and Writing for the

Screen. The television-radio courses are: Introduction to Television-Radio, Radio Speech, and Television Workshop. A number of other courses are offered in Theater Arts.

The **Fourth Annual Robert Flaherty Seminar** will be held August 18-28 at the Flaherty home in Dummerston, near

Brattleboro, Vt. Seminar discussions will be led by Hugh Gray, Dept. of Theater Arts, University of California, Los Angeles, and other authorities on film production will participate. Fee for the 10-day seminar is \$100.00. Application blanks may be obtained from Robert Flaherty Foundation Inc., RFD 1, Box 94, Brattleboro, Vt.

## OSCAR FISHER AUTOMATIC PROCESSING EQUIPMENT

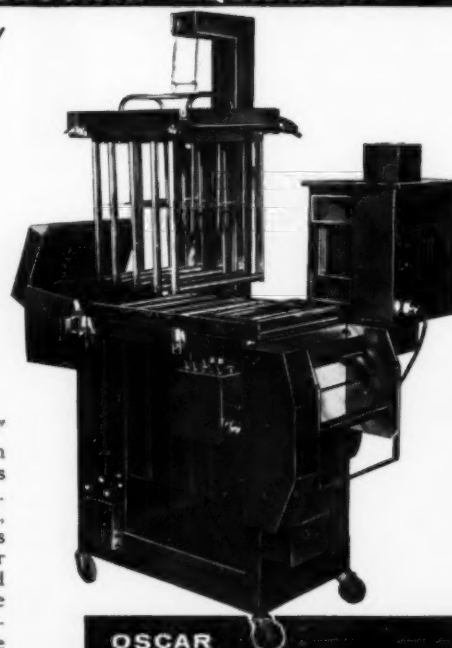
### The Newest Spray Processall Units to Automatically Develop, Fix, Wash and Dry Motion Picture Film

This Fisher Motion Picture Processing Equipment is recognized as the finest in existence. Both units are manufactured to abnormally rigid specifications. Heavy gauge type 316 stainless steel is used throughout. Permanent rust prevention is attained with heliarc welding of all seams. Electrical connections are splash-proofed. Both units are self-threading, operate in daylight, are completely assembled at the factory. Processing times are variable, offering an exceptionally high degree of control of contrast. Temperatures of solutions are also variable and are thermostatically controlled.

Models  
G-6 and  
G-12

Model G-6 (110v, 60 cycle) processes film up to 6" in width. Model G-12 (220v, 60 cycle) processes film up to 12" in width. G-6 weighs 155 pounds, embodies 14 cubic feet, stands 43" long, 13" wide, 66" high. G-12 weighs 315 pounds, embodies 20 cubic feet, stands 43" long, 19 1/2" wide, 66" high. Both units possess positive drive (variable from 3 to 12 feet per minute). The units are designed, engineered and tested to remove human error. The units incorporate the latest developments available on the spray processing of motion picture film. They also incorporate advances made by the Manufacturer, and not available elsewhere.

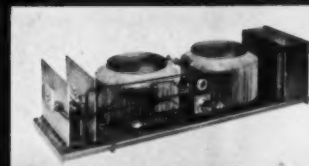
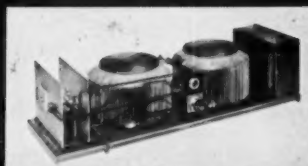
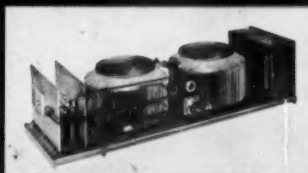
Research, designing and manufacturing of Spray Processall Units, Temperature Control Units, Processing Containers, Microfilters, Motion Picture Film Driers, Anhydrators, Chemical Handling Equipment, Refrigeration Units, Heating Apparatus, Mixers, custom contracts.



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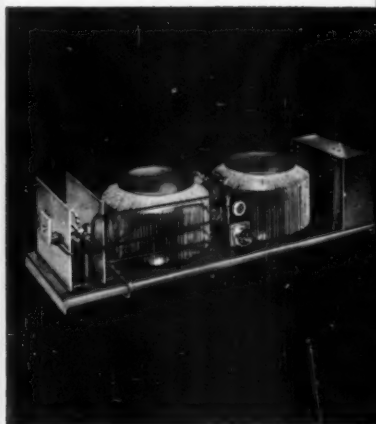
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SPECIFICATIONS	LUMITRON Magnetic Amplifier	MAGNETIC AMPLIFIER "A"	MAGNETIC AMPLIFIER "B"
POWER CAPACITY	10,000 Watts	4300 Watts	6300 Watts
LOAD RANGE	1-10,000 Watts	210-6300 Watts	210-6300 Watts
SIZE	1.4 cubic feet	2.7 cubic feet	2.1 cubic feet
WEIGHT	146 pounds*	158 pounds*	156 pounds*
LINE VOLTAGE REGULATION	$\pm 2\%$ for $\pm 15\%$ line voltage	none	none
OUTPUT CURVE CONTROL	from linear light to linear voltage exactly as specified	slight arbitrary adjustment	slight arbitrary adjustment
PRICE	competitive*	competitive*	competitive*

\*Note that the price and weight of the LUMITRON 10,000 Watt Dimmer is compared with the other 2 units of 6300 Watt capacity. It is, therefore, less expensive and lighter.

Because of the size, weight and rugged construction of the LUMITRON Dimmer, a system utilizing it can be supplied which will "troupe" satisfactorily.

C. L. Schuler, Inventor  
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Brigham Young University has begun construction of a new motion-picture studio, located on a 15-acre tract in a sylvan setting in Provo River bottoms at Carterville, north of Provo. The \$225,000 studio is being built by Paulsen Construction Co. of Salt Lake City. The structure is 110 by 130 ft, the sound stage occupying 80 by 110 ft. On two sides of the sound stage will be the two-story office and storage sections which include director's offices, script office, editing room, art studio, dark rooms, shops, dressing and make-up rooms, projection theater, animation camera workroom, boiler room, echo chamber and control room.

The studio was organized in 1953 and is the only major producing motion-picture establishment in Utah. It has made 17 feature films and reports dozens of others on its schedule board as Church, University and civic projects.

A total of 510 periodicals, including the *SMPTE Journal*, will be indexed in a forthcoming publication announced by Micro-Photography Co., 97 Oliver St., Boston 10. The periodicals are those indexed by the Library of the U.S. Naval Research Laboratory. Several hundred thousand entries on scientific subjects have been compiled. The original index cards are to be reproduced in book form by offset printing, 21 cards per page, 10 by 14-in. Author, and subject, sections and monthly, quarterly and annual supplements to each can be purchased separately. The publication will be available only to those who subscribe in advance of printing which is scheduled for the 3rd quarter of this year. The subscription price was not announced.

A film produced by Bob Jones University, Greenville, S. C., was selected as the American entry in the college and univer-

sity class at the International Film Festival held May 14-18 at Cannes, and at the International Congress of Schools of Cinema, May 20-23 at Paris. The film, *Wine of Morning*, is based on a novel written by the President, Bob Jones, Jr., and deals with religious themes. Katherine Stenholm, director of Unusual Films, the university's motion-picture division, has been selected by the University Film Producers Assn. to represent the United States at the International Congress of Motion-Picture and Television School Directors to be held at Cannes and Paris, May 14-23, as part of the Festival. Almost two years of research went into the production of the feature-length film and sets and props were specially designed.

## Obituary



Carlos Connio Santini

Carlos Connio Santini, President of Alex Laboratories, Buenos Aires, died last year at the age of 48. A member of this Society, among his contributions is "A List of Motion-Picture Technical Terms in Five Languages," published in the *Journal*, February 1956, and later widely reprinted. Mr. Santini had a lifelong interest in the technique and development of motion pictures.

At the age of 22 he founded Cine Club Argentino, many of whose members later became important contributors to the industry. He started his career as chief technician for one of the first motion-picture studios in Argentina. Later he spent some time at Kodak Research Laboratories, Rochester, N. Y., studying motion-picture technique. Following the death of his father, who was founder and owner of the Alex Laboratories, Mr. Santini became General Manager, a post he held until his death. In addition to *Journal* contributions, he published numerous technical works in Spanish.

A tribute received from Antonio M. Bava, Director Gerente General of the Laboratories stated: "For all of us who had the privilege to know him and to appreciate his work, who worked under his leadership and who had the pleasure to be his friends, his memory will never die."



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300mm f/3.5  
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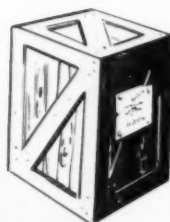
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## new products

(and developments)

.....  
Further information about these items can be obtained direct from the addresses given. As in the case of technical papers, the Society is not responsible for manufacturers' statements, and publication of these items does not constitute endorsement of the products or services.

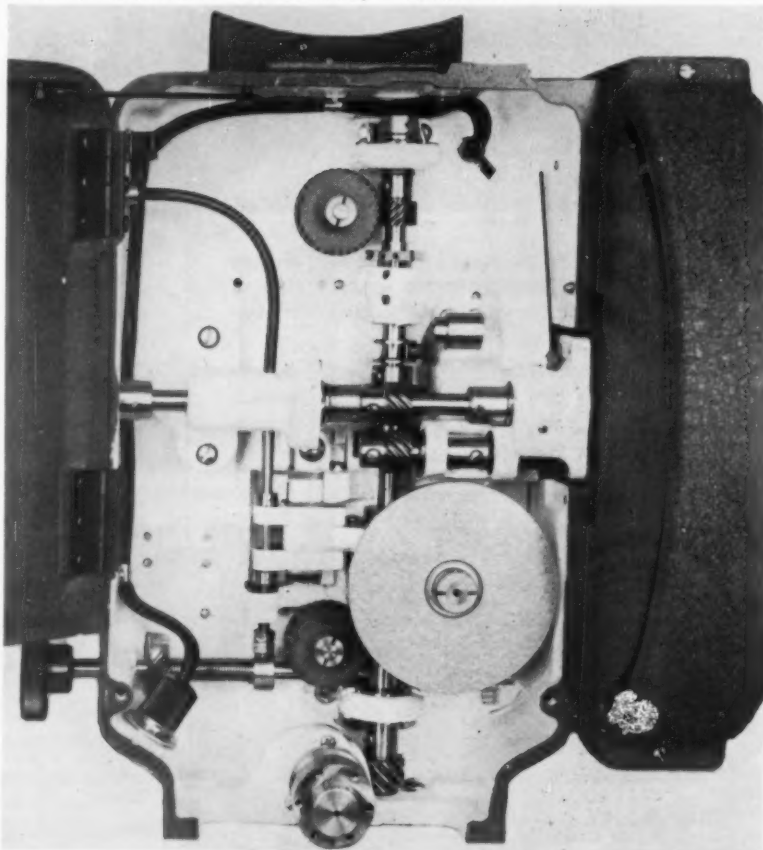
A new line of projectors to succeed its C and CG Models has been announced by Century Projector Corp., 729 Seventh Ave., New York 19. The new Models H (single shutter) and HH (double shutter) are designed to incorporate all applicable new developments into a modern standard 35mm projector. In announcing the new line the company affirmed its faith in the future of the motion-picture industry and 35mm film which, the announcement stated, "is now and will continue to be a world standard for many, many years to come." The company has designed projection equipment for Cinerama, Paramount Horizontal VistaVision and Cinemiracle,

A. F. Victor, Alexander F. Victor Enterprises, Box 266, Carmel-by-the-Sea, Calif., announced in a recent letter to SMPTE Headquarters that he has applied for patents on a device which will permit telecasting of 16mm motion pictures that had originally been taken at 16 frames/sec. Although the device is not yet available, Mr. Victor urges owners of old 16mm pictures which may be of interest for TV to save their films.

Westrex Corp. and Litton Industries, Inc., have announced jointly the completion of preliminary negotiations for the purchase of Westrex by Litton, with patent license agreement and continuation of Westrex' present Employee Benefit Plan to be worked out by a projected closing date of August 15. Litton specializes in manufacture of computers, data processing and navigation equipment, microwave tubes and electronic components.

and the yet to be announced 20th Century-Fox 55-35mm projector.

Among the innovations included in the new projectors are larger, heavier star-wheels and cams in the intermittent movements, plus new more accurate mounting for the more easily changeable intermittent sprocket. New lens mounts provide for higher speed projection lenses yet to be developed. Curved film traps and film gates with "air flow" air cooling have been designed for better control over the film. Water cooled film traps are optional — available for installations with larger arc lamps necessitating more attention to excessive heat.





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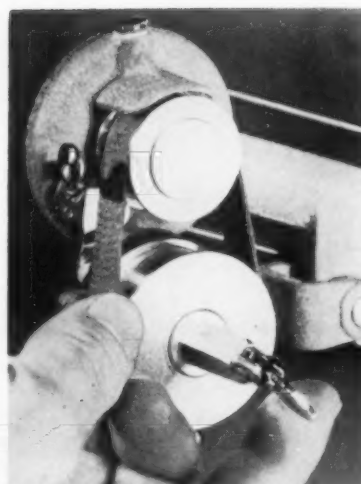
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A new high-fidelity, 16mm sound motion-picture projector was demonstrated by the Harwald Co., 1245 Chicago Ave., Evanston, Ill., at the Open House and Audio-Visual Workshop held at the firm's new plant, February 13-15, 1958. A specially designed 50-w amplifier was demonstrated with the projector. The projector, now available on special order, has standard Harwald Movie-Mite mechanism in the film transport. One feature of the electronic design is the use of a blue-sensitive vacuum phototube. The projector can be fitted with a synchronous motor for use as a film phonograph.

A new Filmosound 16mm motion-picture projector has been announced by Bell & Howell, 7100 McCormick Rd., Chicago 45. The new Model 385 has a rewind safety interlock built into the newly designed take-up reel arm to prevent a common cause of film breakage. The arm has a spindle which automatically disengages the rewind gear upon removal of the reel. Factory-sealed lubrication is provided. The amplifier is 15-w and a voltage regulator keeps voltage to the photocell constant. Reserve gain is provided to compensate for variation in soundtracks and to assure sufficient sound volume in low-voltage areas. Prices remain the same as for the comparable previous models.



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A COMBINATION YOU CAN'T BEAT**

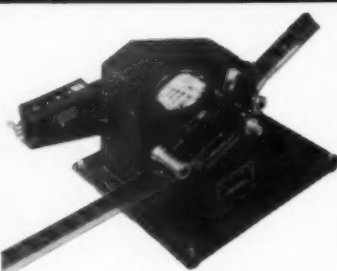
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Only tightwind operating on ball bearing roller. **\$29.00**



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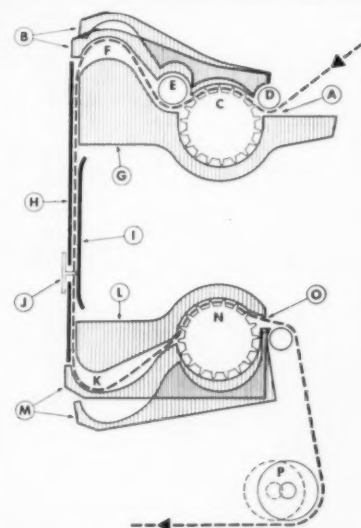
Permits viewing of film between rewinds forward or backward—at rewind speed. Designed especially to facilitate viewing original negatives without scratching. Ideal for editors, lab workers, etc. Rotary Viewer **\$159.50** Footage and frame counter Optional **\$64.90**

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The Bell & Howell Auto Load 8mm movie projector is designed on the principle of supplying guiding surfaces which the film's compliance prompts it to follow. Following the dotted line in the diagram, the film is inserted at (A) after the two interlocked loop formers (B) and (M) have been closed. The teeth of sprocket (C) take the film and push it through channel (F) formed by the upper loop former (B), rollers (D) and (E), stationary guide (G), aperture plate (H) and pressure plate (I), until the shuttle tooth (J) enters the film perforations. The film is then pushed by the shuttle tooth into the lower channel (K) formed by the stationary film guide (L) and the movable lower loop former (M) until it is taken by the teeth of the lower sprocket (N) which carries the film out at (O).

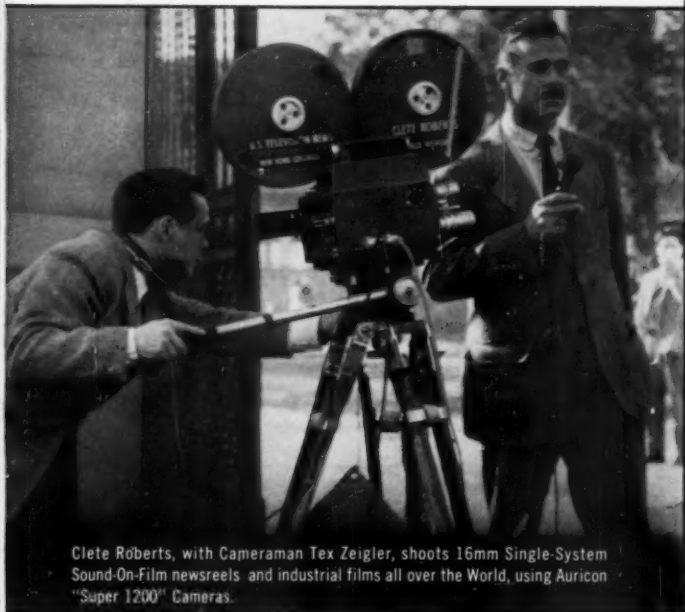
The projectionist takes the film over the film roller (P) to the take-up reel. The two movable film guides (B) and (M) and roller (P) are linked inside the projector to allow the film guides to open automatically when the film gets the first tension from the take-up reel. Film can be attached to the take-up reel without stopping the projector. If the projectionist forgets to close the loop formers when starting threading, roller (E) stops the film at that point.

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The Argus M 500, an 8mm projector which weighs only 11 lb and has a film reel capacity of 400 ft, has been announced by Argus Camera Div., Sylvania Electric Products Inc., 1740 Broadway, New York 19. Enclosed in an aluminum case, it is 6 in. wide, 8½ in. high and 10½ in. long. The compactness of the projector is due principally to the use of the company's Tru-Flector projection lamp (*Journal*, p. 120, Feb. 1958). The 22mm f/1.5 lens is set in a spiral mounting for ready focusing. The projector is priced at \$89.95.

A 750-w Kodak Showtime 8 Projector has been introduced by Eastman Kodak Co., Rochester 4, N.Y. It is equipped with a ¾-in. focal length f/1.6 lens to provide 5 by 7-ft projection in rooms of average size. A integral part of the projector is the new Kodak Prestape Movie Splicer. The splicer makes notched cuts on each frame to be spliced. The two pieces are then held together with Kodak Prestape which has the same size and perforations as the film. The projector is priced at \$174.50. A 500-w model is available at \$123.50 list or, with variable-speed control, at \$139.00.

A Kodak Film Cleaner with added lubricant has been announced by Eastman Kodak Co. The cleaner removes dirt and old lubricant from the film while restoring the proper amount of new lubricant to the film. It can be used on film striped with Kodak Sonotrack Coating without harming the soundtrack. Available from Kodak dealers, it is priced at 90 cents per 4-oz bottle.

A magnetic amplifier dimmer for TV and stage lighting control has been announced by the Lumitron Div., Metropolitan Electric Mfg. Co., 2250 Steinway St., Long Island City 5, N.Y. Designed to prevent undesirable interaction between high-current load circuits and low-current signal networks, or other electrical interference, the amplifier features a self-balancing, negative-feedback for maximum stability and regulation on both line and load variations. It has a maximum power rating of 10,000 w and a minimum of 1 w. Maximum temperature rise is reported 55 C on continuous duty with 10-kw load. Its volume is 1.5 cu ft; weight, 150 lb.

A new "Superior" 2 film has been announced by the Photo Products Dept., E. I. du Pont de Nemours & Co., Wilmington, Del. The new film, Type 936 Fine Grain, is of finer grain than its predecessor (now discontinued) and is hardened to withstand processing temperatures as high as 125 F. It is available in 16mm and 35mm daylight-loading and lab-pack rolls, footage numbered. Its exposure indexes, for use with ASA-calibrated exposure meters, are 80 Daylight and 64 Incandescent.

S.O.S. Cinema Supply Corp., 602 W. 52 St., New York 19, has announced a magnetic film stripping machine. Available in two models, H8 for 8mm film and H16 for 8mm or 16mm film, the machine has been especially designed for users with budgetary and space limitations. Occupying less than 7½ sq ft and weighing approximately 150 lb, the unit can be set on any table or bench. In making the announcement, the firm noted such items as the capacity of 2000 to 2200 ft/hr; micrometric adjustment of coating thickness, accurate adjustment of variable width strips; use of filtered, heated air in the drybox; application in one operation of sound and balancing tracks, and use of adjustable polishers to minimize head wear.

A new type of microphone has been designed for relatively less weight and greater sensitivity by Radio Corp. of America. The microphone was described in a paper presented on April 22 at the Society's Convention at Los Angeles by Harry F. Olson, Director, Acoustical and Electromechanical Research Lab, RCA Laboratories, and by John Preston, members of the team of scientists who worked on the project. The new microphone employs electrostatic principles used in early broadcast microphones more than 25 years ago, before development of the electromagnetic velocity microphone in standard use today. Development of new materials and techniques made possible the reversion to the earlier principle, with resultant advantages in terms of size, weight and economy.

The Tele-Cinor 145mm f/4.5 for the Camex Reflex 8 single-lens reflex camera is announced as "the longest telephoto lens available to 8mm motion-picture fans." The lens is distributed by Karl Heitz Inc., 480 Lexington Ave., New York 17, through franchised Camex dealers. It has an angle of view of 3° with a focusing range from infinity to 10 ft, and a magnification of 12. It is 4½ in. in diameter and weighs 10 oz. It is priced at \$129.00, including the lens hood.

Zoomar Inc., Glen Cove, L.I., N.Y., has announced a lens for industrial TV cameras, the ITV Zoomar Mark II. The 2½-lb unit has three built-in motors and may be attached to any ITV camera by means of a standard "C" mount. Dimensions are 5 by 3½ by 3½ in. The lens has a full zoom range of 6:1 and features two focal length ranges, 22 to 130mm and 35 to 210mm. A speed of f/3.5 is constant over the entire zoom range. The lens is supplied as a basic unit with motor drives for distance setting, zoom and iris control.



# New! ARRI 1000 FT. BLIMP FOR ARRIFLEX 35



The new 1000 ft. Blimp converts the ARRIFLEX 35 into a full-fledged SOUND STUDIO CAMERA, and brings further versatility to the ARRIFLEX 35 system. It accepts the ARRIFLEX 35 with regular synchronous motor, and utilizes standard Mitchell magazines, which are joined to the camera by means of an adapter, supplied with the Blimp. No alterations are necessary on the ARRIFLEX 35 or the Mitchell Magazine.

No tools are needed. It takes but a few minutes to change the ARRIFLEX 35 from hand camera to studio camera or vice versa.

## Features:

Modern acoustic damping methods afford extreme sound absorption. Permits use of microphones within 3 ft. of Blimp.  
Remote focus drive from 3 positions.  
Remote diaphragm adjustment.  
Through-the-lens-focusing and viewing.  
Matte box with leather bellows adjustable by geared struts.  
Large front port permits use of 18mm wide-angle lens.  
Adapter available to use anamorphic lenses.

Built-in filter holder for 3x3" filter.

Large Control windows for distance scale, diaphragm scale, footage counter and tachometer.

Wired for buckle switch which can be built into existing cameras and is factory supplied with camera if bought with Blimp.

ARRI-Precision Engineered for a lifetime of trouble-free service.

**\$3,995.00** FOB N.Y.

**A complete sound camera outfit: Arriflex 35, lenses, synchronous motor, magazine, ready to shoot, can be purchased for less than \$7,000.00! Available on convenient long-term lease plan with option to purchase.**

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In Canada: Gevaert (Canada) Ltd., 345 Adelaide St., West, Toronto



The Houston Fearless Corp., 11827 W. Olympic Blvd., Los Angeles 64, has announced Model RCH-3 camera head for

small industrial-type TV cameras. Mounted on a light-duty tripod or other support, the head will handle cameras up to 20 lb. Powered by two Bodine motors, it will tilt the camera 45° up or down and rotate 370°. It can also be mounted vertically for operation of the camera in a vertical position. Speed of operation is 2°/sec in elevation, 3½°/sec in azimuth. The control unit can be located at a considerable distance from the head.

The company also announced a 78-lb. portable TV pedestal, the PD-10. Designed to provide a steady mount for all monochrome TV cameras, it will accept any standard head. A hydraulic jack is mounted on the center column for raising and lowering the camera. The three wheels can be locked in parallel for straight-line tracking or left free for maneuverability.

## Westrex



The precision-engineered film editing machine that won an Academy Award for scientific or technical achievement.



- Rewind flange
- Easy threading
- No intermittent
- Framing control
- Quiet operation
- Adjustable height
- Automatic fast stop
- Monitor loudspeaker
- Plays negatives safely
- Minimum film damage
- Prefocused lamps easily replaced

- Centrally located control panel
- Mark films with gates closed
- Seconds counter to five places
- External picture focusing control
- Footage counter in feet and frames
- Sound and picture interlock control
- Placement of controls minimizes arm movement

## 16 mm EDITER 35 mm

- Photographic and single or multiple magnetic sound
- Rotating prism permits slow lap dissolve of picture
- Wall screen projection and translucent screen viewing
- Projection viewing for both CinemaScope and standard films
- Picture sound synchronization while running or stopped
- Take-up assemblies for 3000-foot 35mm and 1600-foot 16mm reels

Designed and engineered by the Westrex Hollywood Laboratories—in cooperation with leading studios—the Westrex Editor for 35mm and 16mm film is the modern machine which meets every film-editing need. Send today for additional information on the 35mm and 16mm Westrex Editors—your first step toward better, faster, easier editing!

**Westrex Corporation**

Headquarters: 111 Eighth Avenue, New York 11, N. Y.

Hollywood Division: 6601 Romaine Street, Hollywood 38, Calif.

A new video tape recorder developed by British Broadcasting Corp. reportedly may be of particular use in Europe because of the difference in broadcast standards. The machine, called the Vision Electronic Recording Apparatus (Vera), records along the length of the tape. (Longitudinal recording was tried by U.S. engineers, but was discarded when Ampex perfected horizontal recording.) The British recorder uses ½-in. tape which makes it more economical to run than the American machine which requires 2-in. tape. Splicing is easier on the Vera than on American machines and Vera also provides simultaneous recording and monitoring.

Chief apparent disadvantage, from the point of view of American producers, is the machine's high speed (200 in./sec). While this is no drawback in Great Britain where the 405-line, 25-frame system has only 10,500 lines/sec, using 2½-mc bandwidth, it is unsuited to the United States 525-line, 30-frame, 15,750 lines/sec, 4-mc bandwidth standard.

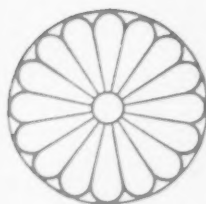
BBC research engineers have spent five years developing the recorder and two prototypes are now in operation. It is expected to be commercially available in the near future.

A British firm, Associated Rediffusion, has purchased two Ampex VR-1000 Videotape Recorders to pre-record complete TV programs for commercial use throughout England. Kurt Machein, the export video specialist for the Ampex Professional Products Div., will supervise modification of the machines to British broadcast standards. England is the fourth country, other than the United States, to which video-tape recording equipment has been shipped, the others being Canada, Japan and Germany.

Ampex Corp., Redwood City, Calif., has announced availability of color conversion accessories which are used to adapt VR-1000 Videotape Recorders from black-and-white to color. The conversion takes place by the addition of an electronics rack to the recorder. WGN-TV, Chicago, is the first station scheduled to receive the converter. An undisclosed number of color accessories have been delivered to networks.

A new line of RCA magnetic tapes has been announced by Radio Corp. of America. The tapes use either acetate or Mylar as a base for oxide coating impregnated with dimethyl silicone to provide lubrication for the life of the tape. The tapes are available on either 5- or 7-in. reels and in thicknesses of ½-, 1- or 1½-mils. The 5-in. reels are available in 600-, 900- and 1200-ft lengths. The 7-in. reels are available in 1200-, 1800- and 2400-ft lengths.

Pyral, 47 Rue de L'Echat, Créteil (Seine), France, has announced that it is manufacturing, in France, perforated ½-in. tape with 8mm or 16mm perforation. In making the announcement, S. A. Pyral, General Manager of the company, said that he had read with interest the article, "Notes on the Sprocketape Magnetic Sound Recording System," by Chester E. Beachell (*Journal*, 66: 742-745, Dec. 1957).

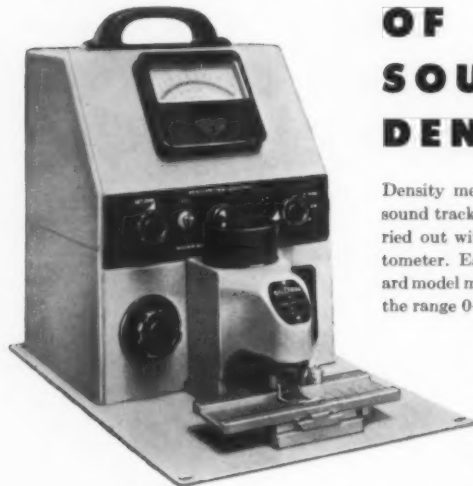


On the misty green isles of Japan, General's globe-trotting Ambassador of Good Filmanship paused to capture a rainy, serene moment of her idiomatic beauty on film...

Here, in an ancient land of many breathtaking moments, we pay a call on an exciting, vigorous young film industry, known — as General Film itself is known — for its high standards, consummate skill and artistry, and ever-expanding areas of accomplishment.



## ACCURATE MEASUREMENT OF SOUND TRACK DENSITY



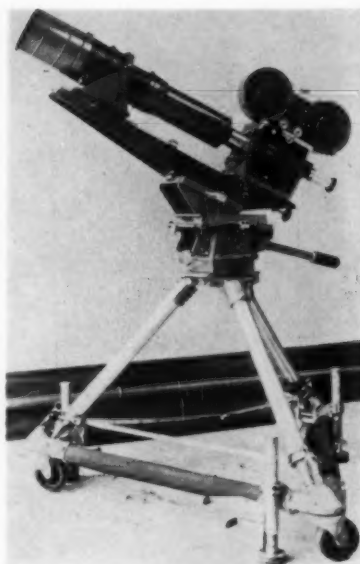
Density measurement of negative and positive sound tracks can be speedily and accurately carried out with the Baldwin Sound Track Densitometer. Easily fitted to a rewind desk, the standard model measures black and white density over the range 0—4.0 using an aperture 0.10" long by 0.02" wide, and colour density over the same range using an aperture 0.10" long by 0.045" wide. All models are supplied with the scanning slit parallel to the film perforation.

Complete, easy-to-read information on the Baldwin Sound Track Densitometer is given in Brochure 117—write *now* for your copy.

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scientific instruments

**BALDWIN INSTRUMENT COMPANY LTD.**  
**DARTFORD • KENT • ENGLAND**

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The 35mm Vinten HS-300 intermittent motion camera, manufactured in England, is now available in the United States through Benson-Lehner Corp., 11930 Olympic Blvd., Los Angeles. Designed for research work, the frame rates are from 24 to 300 frames/sec. The intermittent motion device is comprised of a twin claw on each side for feeding the film, and a twin register pin on each side for locating it in register. The standard 35mm film magazines for the camera are interchangeable. Special 1000-ft magazines are available. The camera shutter is adjustable to give a range of openings from 170° to 10°.

## Send Your Film To The Complete 16MM Service Laboratory

Unsurpassed for ...

**SPEED**

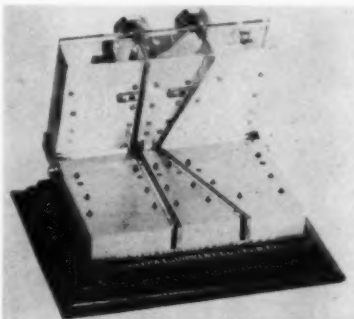
**QUALITY**

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SERVICE**

**MOTION PICTURE LABORATORIES, INC**  
1672 Union Ave., Memphis 4, Tenn., Phone BRoadway 5-2323



*The Master Craftsmanship Your Film Deserves*



A tape splicer introduced by Camera Equipment Co., 315 W. 43 St., New York 36, is described as providing clean, even, sharp splices for all types of film, including Du Pont Cronar polyester base. The splicer, called Ace Clear-Vision Model II, has a recessed blade designed to cut evenly. Depressed by pushbuttons, the blade immediately springs back into its recessed position. Center bars in the base push the film back up after it has been spliced. The splicer has a nonmagnetic construction. The film is spliced with 1½-mil Mylar perforated transparent tape. The taped splices are reported to be unaffected by film cleaning solutions or humidity. The splicer is priced at \$125.00.



When you can't budge from the Budget...see **CECO!**



**Bell & Howell  
Continuous Film Printer**

Prints either sound or picture by contact. Suction-cooled lamphouse; removable filter holders; 300 watt projection type lamp. Other B & H Models and accessories available. **\$4,600.00**

Other Printers  
from **\$167.50**



**Bowlds Animation Disc  
and Peg Bar**

Animation Disc features oversize contoured glass; convenient rotation; positive lock; full vision sliding scale; and clear, opal, or frosted glass. Peg Bar has precision pegs so that cels slip on and off easily. Has countersunk holes and flush screws for easy attaching.

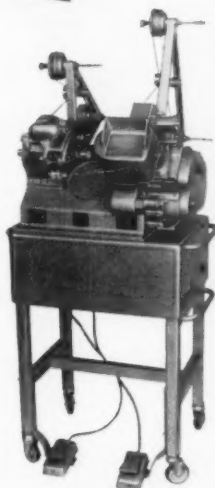
Animation Disc **\$47.50**  
Peg Bar **6.50**

**Moviola Film  
Editing Machine  
"Series 20"**

Designed so that short pieces can be used without putting film on reels. Rear projection screen. Reversed by hand-operation switches. Other models and Rewinders, Synchronizers, and Sound Readers available.

Model UD20S  
(Illustrated) **\$1,925.00**

Other Film Editing  
Viewers from **\$49.50**

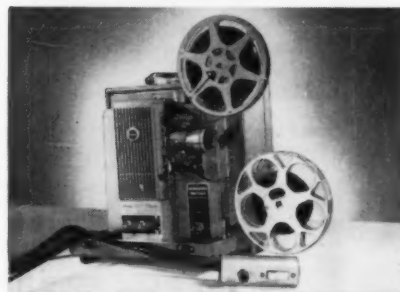


**When you make commercial films, the budget is sacred. It isn't like the old days in Hollywood when a big name director could go a couple of million over his budget—and get away with it. Today if you exceed your budget, it very likely will come out of your own pocket. So do what other smart producers, directors, cameramen and sound engineers do. Consult CECO. Our experts have the know-how about equipment and money-saving techniques. We carry the world's largest assortment of professional cameras, lenses, tripods, recording, editing, lighting, laboratory and processing equipment, etc. There is never any charge at CECO for consultation. Come by for help with any problem, large or small.**



**CECO Stop Motion Motor for Cine Special**

110 volt AC operation; 1/2 second exposure. Has forward, reverse, on-off switches; frame counter; power cable. Attaches easily to camera without special tools. **\$450.00**



**Weinberg-Watson Modified Version  
of Kodak Analyst**

Gives flicker-free projection at speeds from 6 to 20 frames per second. Single frame operation forward and reverse without damaging film. Quick transition from continuous to single frame. **\$795.00**

**ADDITIONAL PRODUCTS** Camera Equipment Company offers the world's largest and most comprehensive line of professional cameras, accessories, lighting and editing equipment. The quality product isn't made that we don't carry. See our splicers, — exposure meters — projectors — screens — marking pencils and pens — editors gloves — editing machines, racks, barrels, and tables — stop watches.

FRANK C. ZUCKER

**CAMERA EQUIPMENT CO., INC.**

Dept. JS, 315 West 43rd St., New York 36, N. Y. JUdson 6-1420

**SALES • SERVICE • RENTALS**

Photographic equipment used in the McDonnell F-101 Voodoo jet aircraft which, last December, went hurtling through the atmosphere to break four speed records, included an Automax Camera, Traid intervalometer and a Bell & Howell 70 KRM 16mm camera. Before the record-breaking flights were attempted information on the aircraft's performance at various altitudes was required and in-flight fueling problems were studied. A continuous photographic record of all instrument readings was made by the Automax camera which was equipped with an 18½ mm lens. The camera was mounted within the instrument panel, shooting into a front-surface mirror which reflected the readings.

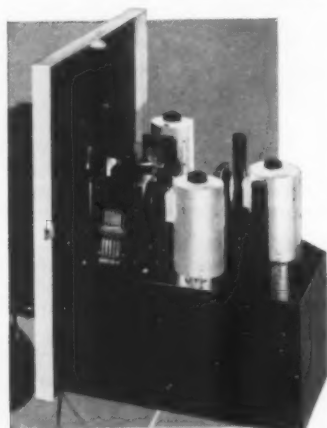
Movielab Color Corp., 619 W. 54 St., New York 19, has issued a 4-page Memo which contains descriptions of 10 different color processes for the production of 35mm and 16mm release prints. Charts illustrating the various processes are also included. Copies are available upon request to the company.

Developments is published by Beckman and Whitley Inc., 985 San Carlos Ave., San Carlos, Calif. The first (and current) issue, Spring 1958, contains a description of the company's new Model 192 Continuous-Writing Framing Camera. Suggested applications include aerodynamic studies and thermal-barrier studies in ballistics investigations.



## 3-LIGHT Additive Color Compensating Head

Supplied to fit existing machines of Depue-Carlson and Andre Debré Step Printers and Bell & Howell Continuous Printer Models D & J.



Used by: Movielab Color Corp., Color Service Co., General Film Labs., Consolidated Film Inds., Pathe Labs., Alexander Film Co., Deluxe Laboratories, U. S. Signal Corps, Ace Film Labs, Warner Bros.

This 3-light additive color unit supplies discrete blue, green and red beams. No one beam contributes to contamination of the others.

Solenoid operated, calibrated neutral density glass filters. Five filters in each color beam, giving 32 printer steps of .025 Log E.

High efficiency interference-type dichroic beam splitters to form a single mixed output beam.

Colored glass and/or high efficiency, interference-type trimming filters, "peaked" to the positive stock sensitivity.

Printing speed up to 125 feet a minute for continuous printing; 55 feet a minute for step printing.

Three 750-Watt bulbs, operating at 60-80 volts. Assures long bulb life, saving time in calibration.

Adjustable lamp sockets to line up filaments. Three degrees of freedom; vertical, rotational, lateral.

Four-leaf adjustable diaphragm, imaged at the printing aperture which provides an optical printing aperture for exposure and/or uniformity control.

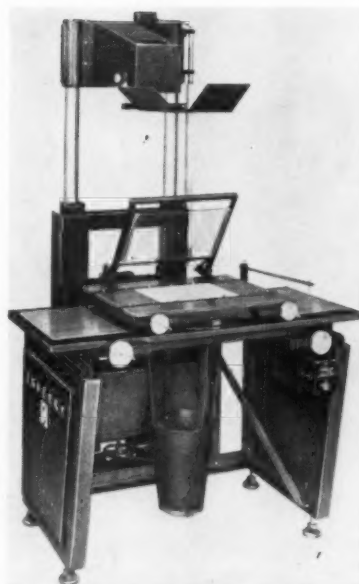
### AVAILABLE ACCESSORIES

3-Channel Memory Unit with Reader for automatic operation of flipper assembly, reading in succession blue, green, red and storing the introduced information. 15 neon pilot lights indicate when the 15 neutral density filters are in or out so that operator can see at a glance if Reader and Memory Unit are functioning properly. For easy servicing, commercially available punched tape reader is used as a base.

Keyboard and Punch with 32 combinations for each color; blue, green, red; with an additional channel for introducing other information such as stop, lap dissolves, etc., and with built-in scene counter. Can also be used with Reader to reproduce automatically duplicate tapes and will permit corrections of the tape and continue with the accepted information.

Write for further information

FISH-SCHURMAN CORPORATION, 85 Portman Road, New Rochelle, N. Y.



A new Oxberry animation stand designed for industrial use was exhibited for the first time April 21-25 at the Society's Convention at Los Angeles by Animation Equipment Corp., 38 Hudson St., New Rochelle, N.Y. The stand is constructed of welded steel and can accommodate all standard 16mm and 35mm camera and stop-motion motors. The carriage operates on ball-bearing rollers which ride on two 2½-in. diameter, chrome-plated, ground steel columns. A removable shadowboard is adjustable and has north-south, east-west matte device. The camera faceplate moves 28½ in. vertically to permit zooms from 3 to 12 field with an Ektar 25mm lens. An adaptor 15mm lens is used for larger fields. The electric zoom control permits continuous, jog and reverse camera movements. The stand is 88 in. high with the camera in top position, 60 in. high with the camera in the lowest position, 64 in. wide, including east-west movement, 50 in. deep, including full south position, and weighs approximately 685 lb.

All compound movements are ball-bearing. The table top measures 21 by 27 in. and is 39 in. above the floor. East-west travel is 11 in. and north-south travel is 9 in. Compound is calibrated for 360° rotation and a manual lock allows it to be secured in any position. Platen is hand-operated and is spring-loaded for easy operation. The table top has a 9 by 12-in. removable section at its center to provide clear space to the floor for underneath lighting. Cel tables measuring 12 by 22 in. are built in on the left and right sides of the compound. Toplighting and pantograph installations are included.

An 8-page illustrated brochure, *How Many Jobs*, describing industrial television equipment produced by General Precision Laboratory, 63 Bedford Rd., Pleasantville, N.Y., is available upon request from the company. Various applications, including installations with unusual engineering requirements, are also described.



# AUTOMATIC TRI-FILM PROCESSOR

**UP TO SIX FEET A MINUTE WITHOUT LOSS OF QUALITY!**



**T**HE transportable Mark 3 Automatic Tri-Film Processor develops and dries 16, 35 or 70 mm. film at 1½, 3 or 6 feet a minute! Four 400-ft. 16 mm. films can be handled simultaneously—or two 400-ft. 35 mm films—or one 400-ft. 70 mm length. The various film sizes are accommodated by simple adjustments of film separators. Separate temperature control of the processing solution is possible on each tank from 60 to 110 degrees F., within  $\pm 1$  degree. The latest high temperature chemical resistant plastics and Type 316 stainless steel are used in all chemical areas. Processing is controlled by a mechanical program unit after the film is loaded into the machine—no special “leader” or continuous tapes, chains or sprockets are used.

The need for stop baths and interbath rinses, normally required in many processes, is virtually eliminated because of a positive squeegee roller design.

A high-efficiency blower system and electrical heating ensure rapid drying in the machine. The Processor is perfect for newsreels, TV news on film, motion picture “rushes” in the field,—in all cases where speed plus quality are essential.

Write for literature and quotations.

## SPECIFICATIONS

### AUTOMATIC TRI-FILM PROCESSOR TYPE T246 Mk3

Size: 54" long, 22" wide, 51" high  
 Weight: 400 lbs.  
 Power Consumption: 5 KVA maximum single-phase: 110 volts, 45 amps, or according to customer requirements  
 Process Capacity: 1 to 4 rolls 16 mm length  
 1 or 2 rolls 35 mm to 70 mm  
 1 roll 70 mm 400 ft.  
 Rate of Processing: 1½, 3 or 6 ft. per min.  
 Temperature-controlled solutions and dryer. Daylight operation except loading of film into magazine. Processes perforated or plain film.

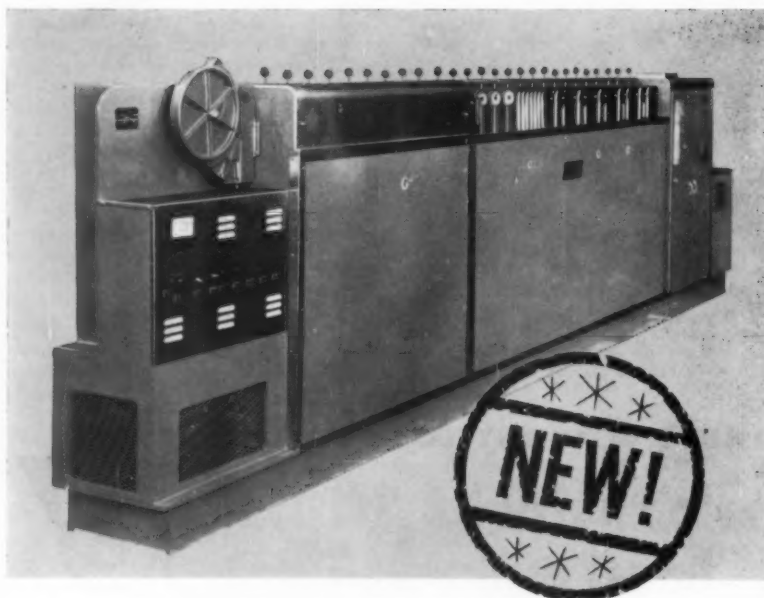
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## HOUSTON FEARLESS COLOR LABMASTER

*Film processor for Ektachrome 7255  
and Anscochrome*

Efficient, fully-automatic processing of 16mm Ektachrome 7255 or 16mm\* Anscochrome reversal color films is accomplished with the new Houston Fearless Color Labmaster. Ease of operation is provided by the many automatic features. The Color Labmaster is a fine, precision-built machine, yet low in price... a result of Houston Fearless' 30 years of leadership in the manufacture of film processing equipment.

- Speed variable up to 30 f.p.m.
- Daylight operating. Dark room model available.
- All tanks stainless steel.
- Variable clutch-drive film transport prevents film breakage.
- All running-water washes.
- Accurate solution temperature controls.
- Double-headed rubber wipers.
- Air squeegee.
- Adjustable lifter rods.
- Filtered-air heat in dry box.
- Extra film magazines.
- Direct reading thermometers.

\*16/35mm model also available



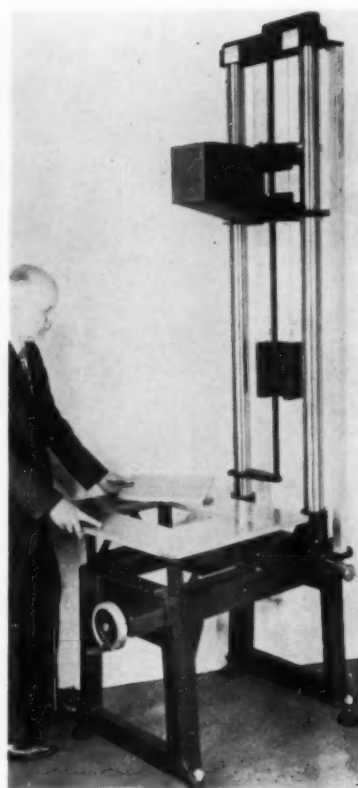
### HOUSTON FEARLESS CORPORATION

11827 W. Olympic Blvd., Los Angeles 64, California

Send catalog and prices on:

( ) Color Labmaster processors. ( ) B & W processors.  
( ) Printers. ( ) Camera heads. ( ) Remote control  
heads. ( ) Tripods. ( ) Dollies. ( ) Pedestals.

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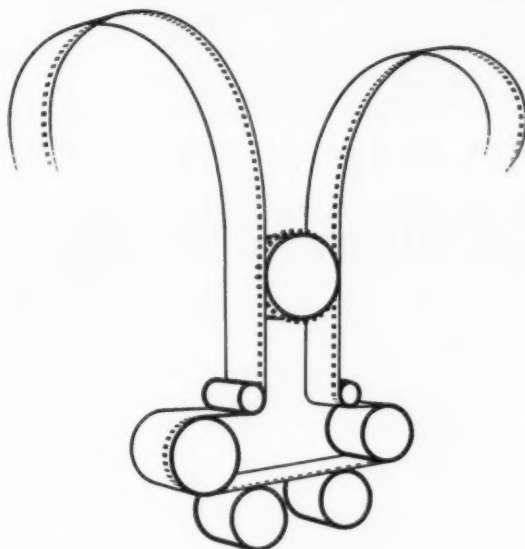


A titling, animation and special effects camera stand and compound table have been announced by Warren Conrad Portman Co., 41 MacQuesten Pkwy. N., Mount Vernon, N.Y. The machine is constructed entirely of castings for rigidity, accuracy and permanent alignment. The basic stand has a cast-iron bed made in one piece and surface ground for squareness between stand and compound. Two ground steel columns, 3 in. in diameter set 15 in. apart, allow artwork to pass between. The fade plate receives any 16mm or 35mm camera. The camera stand can pass through a doorway only 30 in. wide. The compound has ball-bearing-mounted 19 by 26-in. east-west movements which ride on 2-in. ground steel rails. The movements are activated by lead screws with hand wheels and register with counters. The mahogany table top has 360° rotation and a hole 12½ by 9 in. through to the floor for underneath lighting and projection. The basic stand is priced at \$1495.00 and the compound and table top at \$1640.00. A 10-page catalog is available from the manufacturer.

Clairex Corp., 50 W. 26 St., New York 10, has announced a line of small photoconductors. The line comprises a combination of four types of cadmium sulfide and cadmium selenide polycrystalline photoconductive materials with four types of enclosures, two of plastic and two of hermetically sealed glass. A folder giving detailed descriptions of the photoconductors is available from the company.



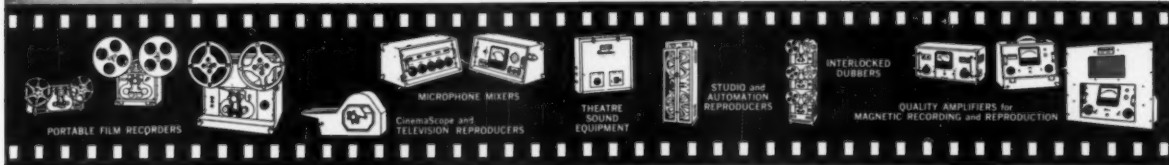
# *"Synkinetic Motion"* celebrates 10th anniversary



Ten years ago, on May 22, 1948, at the 63rd semi-annual convention of the Society of Motion Picture and Television Engineers at Santa Monica, California, Magnasync engineers demonstrated the first 16 mm magnetic film recorder. The paper described a revolutionary new principle of filtering defined as "SYNKINETIC MOTION." This new concept, based on the use of dual-flywheels, has since become widely accepted and used by all leading manufacturers.

Trailblazing is a tradition at Magnasync. The continual development of new theories methodically engineered, perfected and applied has established Magnasync as the international leader in the design and manufacture of quality magnetic film recording devices.

INTERNATIONAL LEADERS IN THE DESIGN AND MANUFACTURE OF QUALITY MAGNETIC FILM RECORDING DEVICES



MAGNASYNC MANUFACTURING CO., LTD., 5546 Satsuma Ave., North Hollywood 2, Calif.



#### DEALERS

NEW YORK: Camera Equipment Co., 315 W. 43rd St., New York 36, N.Y.; JUDSON 6-1420; Cable "CINEQUIP."  
CHICAGO: Zenith Cinema Service, Inc., 3252 Foster Ave., Chicago 25, Ill.; IRVING 8-2104.  
SAN FRANCISCO: Brooks Camera Co., 45 Kearney, San Francisco, Calif.; EXbrook 2-7348.

LOS ANGELES: Birns & Sawyer Cine Equipment, 8940 Santa Monica Blvd., Los Angeles 46, Calif.; OLYMPIA 2-1130.  
INDIA: Kins Engineers, 17 New Queens Road, Bombay, India.  
JAPAN: J. Osawa & Co., Ltd., 5 Ginza Nishi 2-Chome, Chuo-Ku, Tokyo, Japan; Tel: Tokyo 56-8351-5; Cable "OSAWACO."



**50** YEARS OF EXPERIENCE  
in the manufacture of  
SMALL MACHINE PARTS  
OF HIGHEST PRECISION

The equipment you design and produce demands the finest quality in each of its components. For those machine parts requiring fine finishes, difficult machining operations, and closest tolerances specify LaVezzi and be certain of parts that meet approval. Your quotation requests will receive prompt and careful consideration. Illustrated brochure will be mailed upon request.

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4635 WEST LAKE ST., CHICAGO, ILLINOIS



**Filmline** THE  
ULTIMATE IN  
FILM PROCESSING MACHINES



**CONTROLLED  
PROCESSING**  
FOR ALL BLACK & WHITE...  
AND COLOR EMULSIONS

FILMLINE CORPORATION, DEPT. SM-58, MILFORD, CONN.

#### CLASSIFIED ADVERTISING

First three lines \$5.00

Each additional line \$1.00  
per inch \$13.00

**FOR SALE:** 16 mm animation and titling Saltzman stand with reconditioned Kodak Cine Special and heavy-duty stop-motion motor. \$2500. Roger Wade Productions. 15 West 46 St., New York 36. Tel: Circle 5-3040.

**FOR SALE:** FILM DEVELOPERS, Houston K3A, completely rebuilt by original mfr.; guaranteed; complete, ready to operate, \$2,795.00. STEP PRINTERS, 35mm Houston, for separation and dupe negatives; automatic light and filter changer; complete, \$6,500.00. Houston Fearless Corp., 11827 W. Olympic Blvd., Los Angeles 64, Calif.



The Elwood Foto-Meter Model Z-4 has been announced by Fotomatic Corp., 2603 Kessler Blvd., North Drive, Indianapolis 22, Ind. It is an exposure meter designed to pinpoint light readings from small areas in the scene or subject with the highest possible accuracy and sensitivity. The meter reading may be translated to lens settings or ft-L on the sliding scale around the eyepiece. It is calibrated for ASA film indexes from 0.2 to 6,400; lens stops from f/1 to f/45; lens speeds from 8 sec to 1/1000 sec; motion-picture cameras at 32, 16 or 64 frames/sec; the LVS or EV system from 1 to 18; for Polaroid; ft-L from 6,400 to 0.1; and incident light. The angle of light measurement is approximately 2°. It weighs approximately 12 oz and is 7 in. long and 3 in. high. It is powered by miniature batteries and employs a photo-crystal described by the company as a "special type of photoconductive material, the result of many years of research."

Announced as for sale through dealers only, the meter is priced at \$97.50.

Four new 8mm electric-eye cameras have been announced by Bell & Howell, 7100 McCormick Rd., Chicago 45. Introduced last year (*Journal*, p. 510, Aug. 1957), the electric-eye camera uses solar or light energy for automatic lens setting. The new models, ranging in price from \$99.95 to \$159.95, have various new features including a three-lens turret on the higher-priced model, a solar grid which eliminates the need to adjust the camera for the type of film used, a viewfinder tinted to define the area covered by a normal lens and fast f/1.8 lens on two of the cameras. The turret model has both automatic and manual exposure control for special effects such as intentional under- or over-exposure of a scene.

## What The Well Dressed Editing Room Should Wear

### EDITING TABLE & RACK



#### EDITING TABLES & RACK:

HFC editing tables are made of strong angle-iron construction with a bottom rest rack, formica table top, and 9" x 12" flush light well. Stock tables are 24" W x 60" L x 30 1/2" H (ETBR-1) and 28" W x 60" L x 30 1/2" H (ETBR-28). Any size can be made to the editors' specification. The 4 tier table rack fits directly onto the back of the table and is ideal for holding small rolls of film for intercutting. (TR-1).

#### FILM RACK:

HFC angle iron film racks are inexpensive and especially made for 35mm 1000' reels or cans. Each tier holds up to 25 reels or cans. The entire rack can be taken apart and additional holes drilled to move the rods to positions for other reel sizes. Stock sizes are: 4 tier - AR-4, 5 tier - AR-5, 6 tier - AR-6, 7 tier - AR-7.

#### SWIVEL BASE:

HFC swivel bases enable the editor to turn the rewind to 2 additional positions for rewinding the film to be taken up from the editing machine or film bin in proper alignment. The rewind is attached onto the swivel base, which is bolted to the table (SB-1).

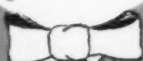
#### LEADER STANCHION:

HFC leader stanchions are attached to the HFC rewind and will hold 3 reels of leader or effects on top shaft front and one reel of leader on shaft in back facing the operator (LS-1).

#### LEADER STANCHION



### FILM RACK



### REWIND



### FILM

#### SYNCHRONIZER:

All types of synchronizers of 16 or 35mm are available from stock, as well as 16 & 35mm combinations; and 35 - 32 and 35mm combinations. Units to handle 55mm, 65mm and 70mm are available on special order.

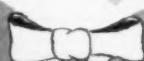
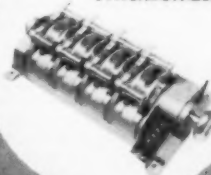
#### REWINDS:

HFC hand rewinds permit the operator to pull one or more reels with a minimum of effort. (RE—for normal winding, REF—with a top friction control, REL—with elbow brake and REL—with universal joint and end support). The outstanding features are: enclosed ball bearings, precision steel cut gears, interchangeable shafts, and a base which is cut at an angle to keep reels from moving up and down the shaft.

#### FILM BINS:

HFC steel film bins are available with hooks and casters. Films are held on the hooks prior to matching. Film bin liners made of cotton drill are used on the inside of the bins to keep the film from being scratched or getting dirty. (SFB-1, 18" x 24" x 24"; LFB-1, 22" x 23" x 32")

#### SYNCHRONIZER



#### SWIVEL BASE



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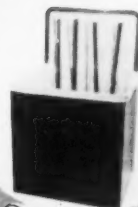
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## employment service

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### Positions Wanted

**Engineering Photographer.** B.S. degree. Twenty years professional experience. Last ten years in two large research organizations, director of photo section for several years. Experience includes commercial and industrial photography, high-speed cinematography, schlieren, 16mm motion pictures. Desires position with opportunity and challenge. Will relocate. Résumé and references on request. Write: Simeon Braunstein, 2666 Valentine Ave., New York 58.

**Cameraman-Editor and Production Man** experienced in educational and documentary work in Japan, Near East and U.S. Currently independent producer of community problem films but interested in camera work and challenging productions anywhere. Extensive film editing and writing background. Own 16mm equipment. Speak several languages; graduate work abroad in anthropology. Age 29, vet and single. Richard Cressey, 101 Windsor Place, Syracuse 10, N.Y.

**Plant Photographer,** Educational TV Broadcasting, Technical Representative. Extensive background in teaching and training TV studio personnel. Twelve years experience in TV and commercial photography. Owned and operated studio with commercial accounts. Veteran, age 33, married. Résumé and references on request. Al Victor, 150-11 14th Ave., Whitestone (57), N. Y. Tel: INdependence 1-2881.

**MP-TV Production or Direction Assistant.** Young man, recent graduate in Communication Arts at New York University, desires position in motion-picture or television production with active film company or TV station. Job must have a future. Age 24, married; vet, willing to relocate. Complete résumé on request. Nat Gold, 325 East 194 St., Bronx, N.Y.

**Optical Effects Company** owner and operator seeks change. Over 8 years experience in opticals and effects work. Familiar with all phases of processing, editing and production. Have also worked as motion picture theatre manager. Willing to relocate. B.A. in Business Administration. Age 32. Reply to: Occupant, Apt. B-32, 796 Bronx River Rd., Bronxville, N.Y.

**Motion-Picture Production.** Experienced in film production, studio and location, educational, industrial and TV films; some editing; extensive theatre and writing background; former CCNY Dept. of Speech lecturer; degrees in drama and journalism. Seeking permanent production assignment with production-direction future. Willing to relocate. Age 29. Résumé on request. Write: S. M. Syna, 24 East 97 St., New York. Tel: TE 1-0444.

**Motion-Picture Production.** Present Director of Motion-Picture Operations at a leading South-eastern University is seeking a position as production executive with a commercial motion-picture operation. College education in fields of Industrial Engineering and Speech, in addition to motion-picture and television production. Experienced in the various phases of film production, as well as labor-management relations. CAA



pilot's certificate, member of SMPTE and University Film Producers Association. Complete résumé on request. Excellent references. If you need a production executive with imagination, contact: Duane K. Wacker, 2050 N.W. 7th Place, Gainesville, Fla.

**Film Maker.** Young man (25), college background in documentary film prod., recent radio-TV experience large ad agency, also live TV, desires position with film producer, USA or abroad. Will send documentary films with screen credits, résumé, scripts and film clips representing proficiency in camera, editing, screen-writing and client relations. Own light 16mm equipment and, through necessity, have become expert at improvising low-budget staging, set-ups and special effects. Write B.K., 2109 W. Keeney, Evanston, Ill.

**Sound Engineer.** Four yr experience in electronics. One yr experience as sound engineer for motion-picture producer. Married. Age 21. Write Serald F. Brownrigg, 916 S. Glasgow, Dallas 23, Texas.

**Motion Pictures.** Position desired in professional motion-picture industry. Graduate Rochester Inst. Tech., May 1958, B.S. in Photo. Science. Chairman R.I.T. Student Chapter of SMPTE. Background in physics, optics, sensitometry, chemistry, photography, etc. Veteran. Résumé on request. Stan A. Feigenbaum, 207 S. Plymouth Ave., Rochester 8, N.Y.

**Industrial Photographer, cameraman, producer.** Broad experience incl.: still and motion-pictures production; camera, editing, darkroom, color processing, type C printing, etc. Long working practice in industrial, commercial, educational, scientific, medical and documentary fields. Have produced hundreds B & W and color films. Knowledge of production and the use of audio-visual media. Excellent background, master's degree; ambitious and reliable personally; perfect Spanish. Able to manage production unit. Have some equipment, will travel or relocate. Write M. Gilkin, 68-46 Groton St., Forest Hills 75, N.Y.

**Sound man** desires position, preferably with educational or technical film producer. 3 yr college, 3 yr technical schooling, 4 yr motion-picture and general sound recording on film, tape, and disk. Experienced in recording, editing, mixing; sound equipment design, installation, repair. Have musical training and experience. Have own tools and test equipment. Age 25, unmarried. Will relocate. For detailed résumé, write: Donald A. Johnson, 700 Prentiss, Apt. 403, Detroit 1, Mich.

**Film Editor and TV Production Supervisor.** 21 yr experience prod. theatricals, industrials, trailers and TV commercials, covering all phases of film production. Desire permanent position with New York organization. Résumé on request. Write William E. Kosh, 22 Willets Ave., Syosset, L.I. Tel: Walnut 1-4656, Plaza 7-6034.

**Producer Cameraman—TV and Motion Pictures.** 15 yr experience in motion pictures, 6 yr producing TV commercials. Desires position with active organization in motion-picture or TV production. Used to hard work and responsibility. Age 38, currently employed by large mfr. Write or call Edward A. "Jack" Price, 2417 Crest Ave., South Bend, Ind. Tel: AT 9-6839.

**Sound Recording.** Young man, 7 yr specialized experience film recording, scoring, mixing, sound editing; 4 yr intensive musical recording, tape, disc. Wide knowledge of music background material and selection. Prefer NYC location. Address: Sound Recorder, c/o Apt. 2-C, 51 Paulus Blvd., New Brunswick, N.J.

**Motion-Picture or TV Studios.** Young man (25) acquainted many phases of photography, film-strip and slide production; 5 yr experience in motion-picture production, employed by Audio-Visual Service USOM/L, c/o American Embassy,

Beirut, Lebanon, as Program Advisor II. Experience in planning, budgeting, scheduling, purchasing and training. Worked as cameraman-director, editor of educational, documentary training and newsreel films in 16 & 35mm B & W and color. Consider any position along lines of above experience. Write: Hrayr B. Toukhanian, c/o 714 Glenwood Avenue, Syracuse 7, N.Y.; Tel: GRanite 5-4614.

### Positions Available

**Mechanical-Optical Engineer.** Must have M.E. background with extensive and intimate knowledge of long focal length optics. Work will involve evaluation and improvement of large tracking telescopes and other optical systems used in missile range instrumentation. Applicants should have the educational and experience background to assume heavy project responsibilities. Salary commensurate with capability, plus outstanding bonus arrangement. Positions are located at Air Force Missile Development Center, Holloman, New Mexico, 10 miles southwest of Alamogordo, N.M. Contact W. F. Goodwin, Personnel Administrator, Land-Air, Inc., Box 394, Holloman, N.M.

**Sales Repr. — Customer Relations.** Well-established, moderate-sized motion-picture laboratory with excellent reputation for quality work, both B & W and color, planning expansion program for area's growing demand. Excellent opportunity for qualified man having thorough knowledge of all phases of film processing as well as experience in customer relations and in new business development. Write Kenneth Reames, 1380 National Bank Bldg., Detroit, Mich., giving qualifications and experience and salary range.

**Electronic Technician.** U.S. Civil Service Commission Announcement No. 151B. Installation and maint. electronic equip. such as computers, detectors, testing and communication, also res. & dev. Grade GS3 through GS12. Salary \$3175.00 to \$7570.00. No written test. Apply to Executive Secretary, Board of U.S. Civil Service Examiners, National Bureau of Standards, Washington 25, D.C. Application forms available from post offices and from U.S. Civil Service Commission, Washington 25, D.C.

**Chemical Engineers.** Young progressive res. & dev. firm in the field of graphic information collection, storage and retrieval for use. Must have B.S. degree or equivalent and 2-4 yr experience in photo-chemistry, preferably processing techniques. Write qualifications and experience to W. R. J. Brown, ITEK Corp., 700 Commonwealth Ave., Boston 15, Mass.

**Senior Physicists.** Young progressive res. & dev. firm in the field of graphic information collection, storage and retrieval for use. Must have M.S. degree or equivalent and 7 or more yr experience in photo-optical design or 5 yr experience in photography with emphasis on image evaluation. Write qualifications and experience to W. R. J. Brown, ITEK Corp., 700 Commonwealth Ave., Boston 15, Mass.

**Sound Engineer.** Expanding 16mm film prod. company and laboratory wants man to take over its sound recording dept. Must have electrical engineering background, with thorough knowledge 16mm optical film recording using Maurer equipment. Work involves studio and location recording on 1/2-in. tape and 16mm magnetic equipment, mixing magnetic tracks to master magnetic or optical tracks, some disk recording, installation of new equipment, maintenance, etc. Experience in some or all phases of 16mm laboratory and prod. work essential. In application give age, education, experience, & salary requirements. Western Cine Service, Inc., 114 East 8th Ave., Denver 3, Colo.

**Film Inspectors.** Temporary or permanent. Write or call Peerless Film Processing Corp., 165 W. 46 St., N.Y. 36. Tel: PLaza 7-3630. Att: Kern Moyse.



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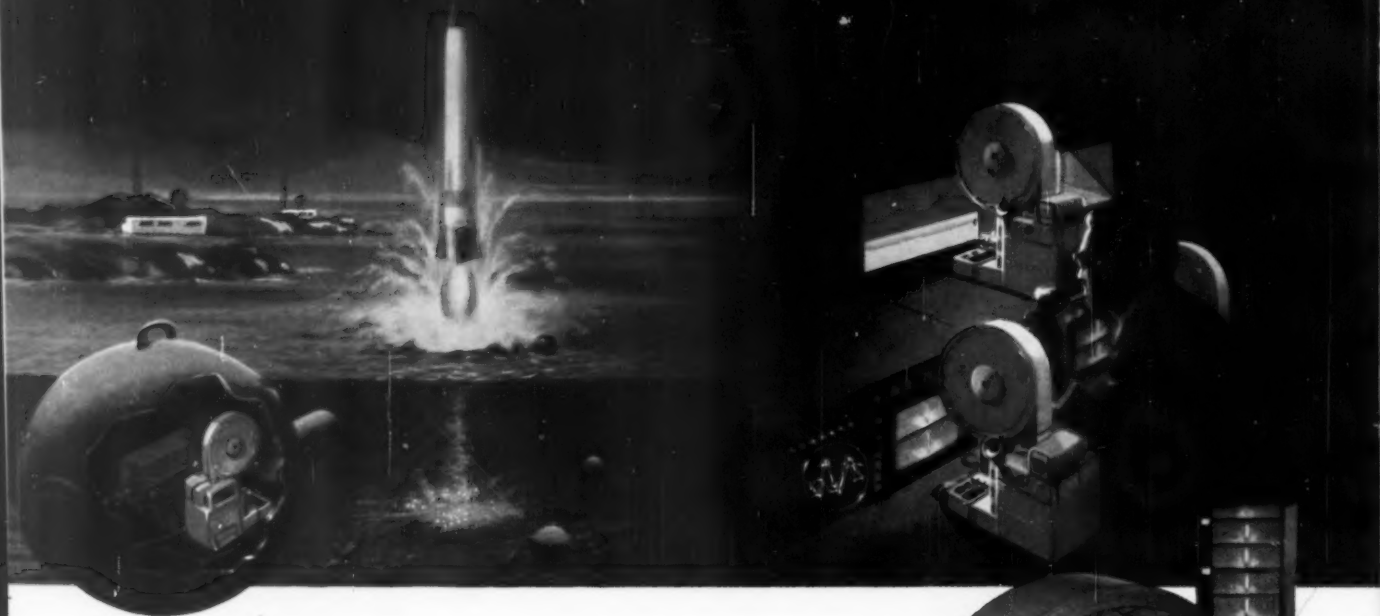
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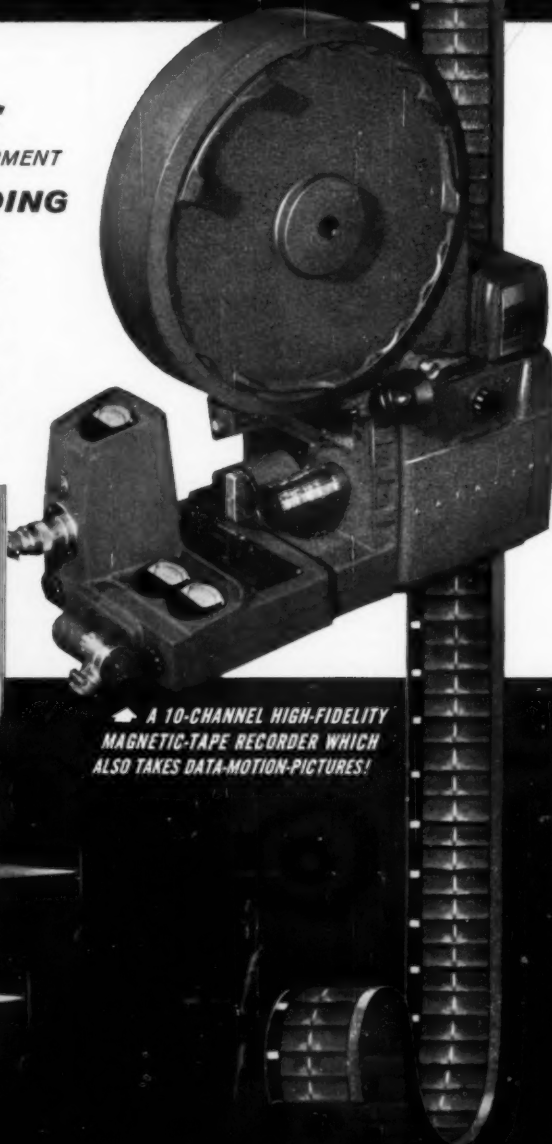


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## Meeting Calendar

Armed Forces Communications and Electronics Association, National Convention, June 4-6, Sheraton Park Hotel, Washington, D. C.	Optical Society of America, Oct. 9-11, Hotel Statler, Detroit, Mich.
American Physical Society, June 19-21, Cornell Univ., Ithaca, N.Y.	National Electronics Conference, Oct. 13-15, Hotel Sherman, Chicago.
International Standardization Organization, Comm. 43 Acoustics, July 14-18, Stockholm, Sweden.	<b>84th Semiannual Convention of the SMPTE, Oct. 20-24, Sheraton-Cadillac, Detroit.</b>
National Industrial Photographic Conference, July 21-25, Conrad Hilton Hotel, Chicago	American Standards Association, Ninth National Conference on Standards, Nov. 18-20, Hotel Roosevelt, New York.
National Audio-Visual Association, Annual Convention, July 26-29, Morrison Hotel, Chicago.	Acoustical Society of America, Nov. 21-23, Chicago, Ill.
National Technical Conference, Illuminating Engineering Soc., Aug. 17-22, Royal York, Toronto.	<b>85th Semiannual Convention of the SMPTE, including International Equipment Exhibit, May 4-8, 1959, Fontainebleau, Miami Beach.</b>
Biological Photographic Assn., Aug. 18-21, at the Shoreham Hotel in Washington, D. C. Will feature award-winning display of transparencies, prints and motion pictures.	<b>86th Semiannual Convention of the SMPTE, including Equipment Exhibit, Oct. 5-9, 1959, Statler, New York.</b>
WESCON, Aug. 19-22, Ambassador Hotel, Los Angeles.	<b>87th Semiannual Convention of the SMPTE, May 1-7, 1960, Ambassador Hotel, Los Angeles</b>
Instrument-Automation Conference, Sept. 15-19, Convention Hall, Philadelphia.	<b>88th Semiannual Convention of the SMPTE, Fall, 1960, Shoreham Hotel, Washington, D. C.</b>
Fourth International Congress on High-Speed Photography, including Equipment Exhibit, Sept. 22-27, Cologne.	<b>89th Semiannual Convention of the SMPTE, Spring, 1961, Royal York, Toronto.</b>
Society of Photographic Scientists and Engineers, Annual Technical Conference, Oct. 6-10, Manger Rochester Hotel, Rochester, N.Y.	<b>90th Semiannual Convention of the SMPTE, Oct. 15-20, 1961, Statler, New York.</b>

**SMPTE Officers and Committees:** The rosters of the Officers of the Society, its Sections, Subsections and Chapters, and of the Committee Chairmen and Members were published in the April 1958 Journal, Part II.

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Charles Ross, Inc.  
S.O.S. Cinema Supply Corp.  
Shelly Films Limited (Canada)  
Technicolor Corporation  
Titra Film Laboratories, Inc.  
Trans-Canada Films Ltd.  
Van Praag Productions  
Victor Animatograph Corp.  
Alexander F. Victor Enterprises, Inc.  
Westinghouse Electric Corporation  
Westrex Corporation  
Wilding Picture Productions, Inc.  
Wollensak Optical Company